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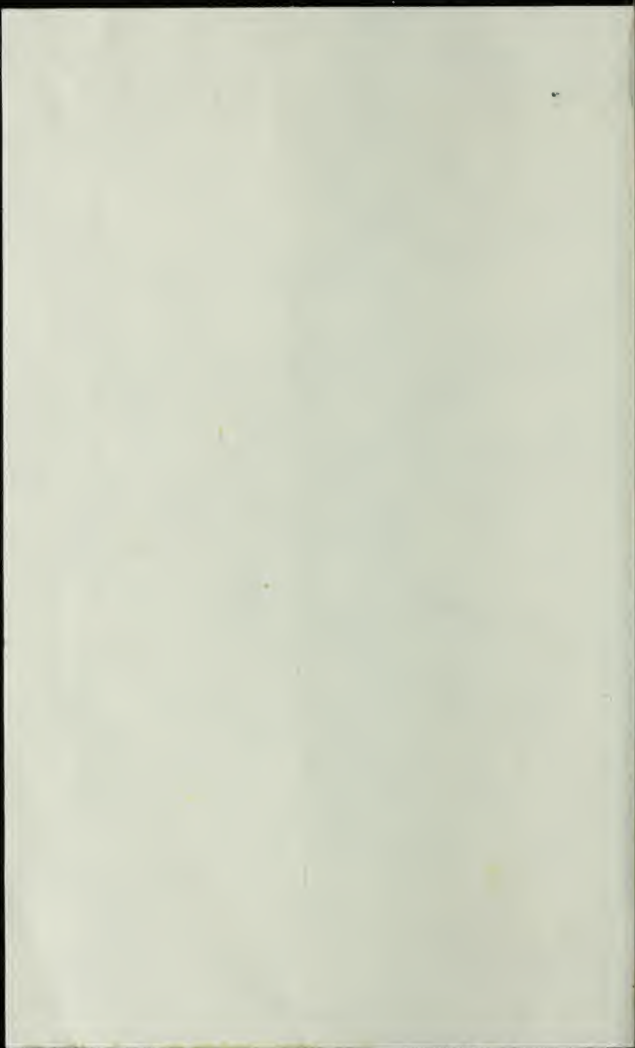
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June 1919

Extension Circular No. 25

UNIVERSITY OF ILLINOIS  
AGRICULTURE LIBRARY

# The County Agents Handbook

Compiled by

I. B. Johnson, County Agent Leader

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Extension Division  
South Dakota State College of  
Agriculture and Mechanic Arts

C. Larsen, Director

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Cooperative Extension Work in  
Agriculture and Home Economics,  
South Dakota State College and  
U. S. Department of Agriculture  
Cooperating

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Brookings, S. Dak.

## INTRODUCTION

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In the daily work of the county agricultural agent, the agricultural extension worker, the farmer, or anyone interested in agriculture, questions arise, whose answers involve much detailed information. Workers have frequently realized the value of a ready reference of pocket size from which such information might be obtained. It is hoped that this handbook may fulfill such a requirement.

The material enclosed is of special application to the agricultural conditions of South Dakota, yet so much of it is of general application that the handbook will be found useful by any agricultural worker. The loose leaf plan enables anyone to add whatever other facts may be deemed essential for conditions in any particular community. Furthermore, any of the facts now contained that are not essential in any community can be quickly removed. The system of classification and keying employed is the same as that recommended by the Department of Agriculture for the filing of bulletins in Circular 2—Extension North and West.

In compiling the handbook much aid has been received from the county agents of South Dakota, the members of the State Extension Division and the Agronomy, Animal Husbandry, Dairy, Entomology and Veterinary Departments of South Dakota State College, and special thanks and acknowledgements are due these workers and departments.

I. B. JOHNSON.

## **1. GENERAL**

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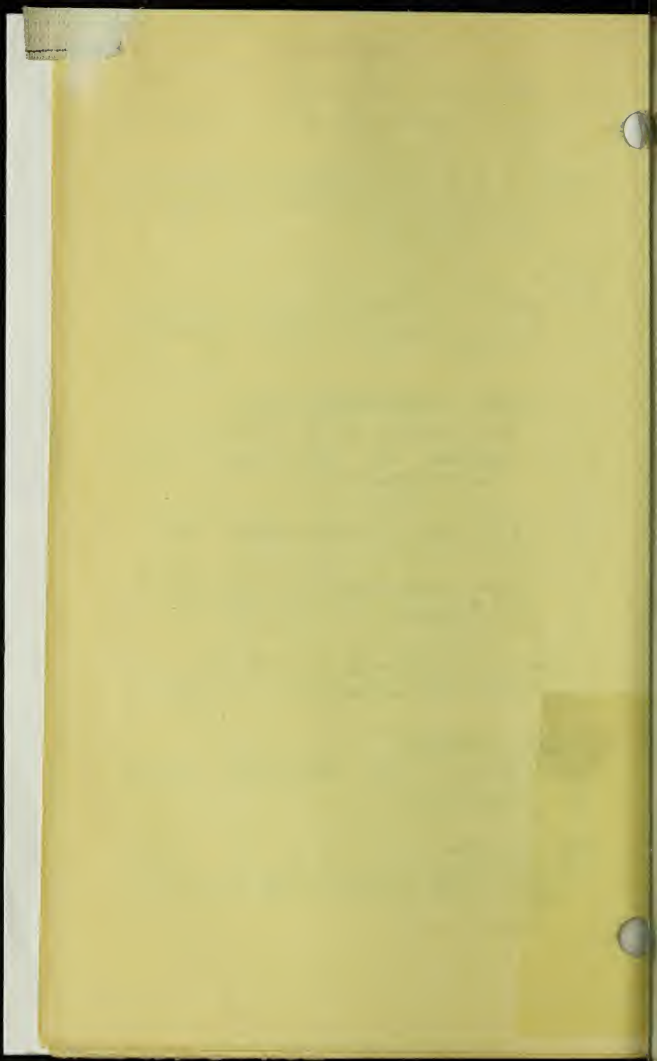
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Temperature map of South Dakota



**DIRECTORY OF DIVISIONS OF U. S. DEPARTMENT OF AGRICULTURE**

Secretary of Agriculture, David F. Houston.  
Bureau of Animal Industry, J. R. Mohler, Chief.  
Bureau of Biological Survey, E. W. Nelson, Chief.  
Bureau of Chemistry, Carl L. Alsberg, Chief.  
Bureau of Crop Estimates, Leon M. Estabrook, Chief.  
Bureau of Entomology, L. O. Howard, Chief.  
Bureau of Markets, George Livingston, Acting Director.  
Bureau of Plant Industry, Wm. A. Taylor, Chief.  
Bureau of Public Roads, Thomas H. McDonald, Chief.  
Bureau of Soils, Milton Whitney, Chief.  
Division of Publications, Edw. B. Reid, Chief.  
Federal Horticultural Board, C. L. Marlatt, Chairman.  
Forest Service, Henry S. Graves, Forester.  
Insecticide and Fungicide Board, J. K. Haywood, Chairman.  
Office of Farm Management, H. C. Taylor, Chief.  
States Relations Service, A. C. True, Director.  
Weather Bureau, Chas. F. Marvin, Chief.

# **DIRECTORY OF THE AGRICULTURAL EXPERIMENT STATIONS**

- Alabama—  
 College Station: Auburn; J. F. Duggar  
 Canebrake Station: Uniontown; J. M. Burgess  
 Tuskegee Station: Tuskegee Institute; G. W. Carver
- Alaska—  
 Sitka: C. C. Georgeson
- Arizona—  
 Tucson: R. A. Kleinsmid
- Arkansas—  
 Fayetteville: M. Nelson
- California—  
 Berkeley: T. F. Hunt
- Colorado—  
 Fort Collins: C. P. Gillette
- Connecticut—  
 State Station; New Haven, E. H. Jenkins  
 Storrs Station: Storrs, E. H. Jenkins
- Delaware—  
 Newark: H. Hayward
- Florida—  
 Gainesville: P. H. Rolfs
- Georgia—  
 Experiment: J. D. Price
- Guam—  
 Island of Guam: C. W. Edwards
- Hawaii—  
 Federal Station: Honolulu; J. M. Westgate  
 Sugar Planters' Station: Honolulu; H. P. Agee
- Idaho—  
 Moscow: E. J. Iddings
- Illinois—  
 Urbana: E. Davenport
- Indiana—  
 Lafayette: C. W. Woodbury
- Iowa—  
 Ames, C. F. Curtiss
- Kansas—  
 Manhattan: F. D. Farrell
- Kentucky—  
 Lexington: T. P. Cooper
- Louisiana—  
 State Station: Baton Rouge; Sugar Station: Audubon Park, New Orleans; North La. Station: Calhoun; Rice Station: Crowley; W. R. Dodson.
- Maine—  
 Orono: C. D. Woods
- Maryland—  
 College Park: H. J. Patterson
- Massachusetts—  
 Amherst: F. W. Morse
- Michigan—  
 East Lansing: R. S. Shaw



- Minnesota—  
     University Farm, St. Paul: R. W. Thatcher  
 Mississippi—  
     Agricultural College: E. R. Lloyd  
 Missouri—  
     College Station: Columbia; F. B. Mumford  
     Fruit Station: Mountain Grove; F. W. Faurot  
 Montana—  
     Bozeman: F. B. Linfield  
 Nebraska—  
     Lincoln: E. A. Burnett  
 Nevada—  
     Reno: C. B. Doten  
 New Hampshire—  
     Durham: J. C. Kendall  
 New Jersey—  
     New Brunswick: J. G. Lipman  
 New Mexico—  
     State College: Fabian Garcia  
 New York—  
     State Station: Geneva; W. H. Jordan  
     Cornell Station: Ithaca; A. R. Mann  
 North Carolina—  
     Raleigh and West Raleigh; B. W. Kilgore  
 North Dakota—  
     Agricultural College: P. F. Trowbridge  
 Ohio—  
     Wooster: C. E. Thorne  
 Oklahoma—  
     Stillwater: H. G. Knight  
 Oregon—  
     Corvallis: A. B. Cordley  
 Pennsylvania—  
     State College: R. L. Watts  
     State College: Institute of Animal Nutrition; H. P. Armsby  
 Porto-Rico—  
     Federal Station: Mayaguez; D. W. May  
     Insular Station: Rio Piedras; E. D. Colon  
 Rhode Island—  
     Kingston: B. L. Hartwell  
 South Carolina—  
     Clemson College: H. W. Barr  
 South Dakota—  
     Brookings: J. W. Wilson  
 Tennessee—  
     Knoxville: H. A. Morgan  
 Texas—  
     College Station: B. Youngblood  
 Utah—  
     Logan: F. S. Harris  
 Vermont—  
     Burlington: J. L. Hills  
 Virginia—  
     Blackburg: A. W. Drinkard, Jr.  
     Norfolk: Truck Station; T. C. Johnson  
 Washington—  
     Pullman: Geo. Severance



1.1

West Virginia—

Morgantown: J. L. Coulter

Wisconsin—

Madison: H. L. Russell

Wyoming—

Laramie: A. D. Faville

# **DIRECTORY OF STATE COLLEGE DEPARTMENTS**

**Willis E. Johnson, President, S. D. State  
College**

## **AGRICULTURE—**

Agronomy .....	A. N. Hume
Animal Husbandry.....	J. W. Wilson
Dairy.....	C. Larsen
Education.....	C. W. Brady
Entomology.....	H. C. Severin
Experiment Station.....	J. W. Wilson
Extension.....	C. Larsen
Home Economics.....	Gudrun Carlson
Horticulture.....	N. E. Hansen
Journalism .....	G. A. Starring
Poultry Husbandry .....	
School of Agriculture.....	M. W. Vittum
Veterinary .....	Dr. C. C. Lipp

## **ENGINEERING—**

Electrical Engineering....	B. B. Brackett
Civil Engineering.....	D. L. Snader
Mechanical Engineering.....	H. C. Solberg

## **SCIENCE—**

Art.....	Ada B. Caldwell
Botany.....	C. W. Michel
Chemistry.....	B. A. Dunbar
Commerce.....	C. F. Schlatter
English.....	Thomas Baldwin
History.....	A. S. Harding
Mathematics.....	G. L. Brown
Music.....	Carl Christensen
Music.....	W. A. Petersen
Pharmacy.....	E. Serles
Physics.....	H. B. Mathews
Preparatory Department.....	R. B. Forsee
Zoology.....	S. P. Miller

## 1.1

## PARLIAMENTARY MOTIONS IN

Parliamentary Motions in Order of Rank (A)	Must it be Seconded?	What Majority for Passage?	Is it Debatable?	Does it Open Question to Debate?	Can it be Amended?	Can it be Committed?	Can it be Postponed?
1. To Adjourn (3)	Yes	Majority	No	No	No	No	No
2. Question of Privilege	No	Majority	Yes	No	Yes	Yes	Yes
3. Orders of the Day (Special)	No	Two-thirds	No	No	No	No	No
4. Appeal from Decision of Chair, Questions of Order	Yes	Majority	Yes- each member may speak once	No	No	No	No
5. To Withdraw Motion	No	Majority	No	No	No	No	No
6. To Suspend a Rule (4)	Yes	Two-thirds	No	No	No	No	No
7. To Reconsider (8) (3)	Yes	Majority	Yes, if main question is	Yes	No	No	No
8. To Lay on the Table (7) To Take from the Table	Yes	Majority	No	No	No	No	No
9. Previous Question (5)	Yes	Two-thirds	No	No	No	No	No
10. To Postpone to Certain Time	Yes	Majority	Yes- as to time	No	Yes- as to time	No	No
11. To Commit, Refer or Re-commit (8)	Yes	Majority	Yes	Yes	Yes	No	No
12. To Amend (9)	Yes	Majority	Yes, if main question is	No	Yes, not an amendment	Yes- takes principal motion	Yes- postpones main question
13. To Postpone Indefinitely (11)	Yes	Majority	Yes	Yes	No	Yes	Yes
14. The Principal Motion	Yes	Majority	Yes	Yes	Yes	Yes	Yes

(A) Motions are arranged in the order of their rank (except Reconsider). Each can supersede one of lower order - none, except amend, can supersede one of higher order

## THE ORDER OF THEIR RANK

Is it sub- ject to Pre- vious question?	Can it be Reconsider- ed?	Can it be Laid on the Table?	Can it be re-moved?	How does it affect Main Question?	(1) An affirmative vote on the orders of the day removes the main question from consideration; a negative vote dis- penses with the busi- ness set for spec- ial time. (2) When the pre- vious question is mov- ed or an amendment, and adopted, debate is closed on the amendment only. (3) Quorum not nec- essary to adjourn. (4) Cannot suspend Constitution or By-Laws. (5) Must be made by one who voted on prevailing side on main question. (6) The previous question applies only to debatable questions. (7) Motions once tabled must be re- moved by motion to take from the table. (8) Motion to com- mit cannot be made after previous question has been ordered. (9) To amend Con- stitution or By-Laws requires two-thirds majority. (10) Motion to suspend not in order after previous ques- tion. (11) Resolutions, motions, or any of the table has been ordered. (12) Motions, as a general rule can be removed after any other motion alter- ing the state of the main question has inter- vened. (13) Postpone in- definitely yields to all secondary questions except amend.
No	No	No	Yes, after other busi- ness in- tervened	Main ques- tion first in order next business meeting	
Yes	Yes	Yes	Yes	Merely sus- pends action on main ques- tion.	
No	Yes	No	No	See note (1).	
Yes	Yes	Yes - sus- tain chr. if carried.	No	Merely sus- pends action on main ques- tion.	
No	Yes	No	Yes	Does not affect it.	
No	No	No	No	No effect	
Yes, affects only reconsider- ation	No	Yes, does not table main question.	Yes	No effect.	
No	No neg. vote. Yes affirm. vote	No	Yes	Tables main question & all second- ary to it	
No	Yes	Yes, tables entire sub- ject	Yes	Postpone im- mediate vote on main ques- tion (2)	
Yes, does not apply to main question	Yes	Yes	Yes	Postpone on the subject to time once third main question and after previous ques- tion (2)	
Yes, forces vote at once	Yes	Yes, tables entire sub- ject	Yes	Postpone on the subject to time once third main question and after previous ques- tion (2)	
Yes, forces vote at once	Yes	Yes, tables entire sub- ject.	No	See note (10)	
Yes, does not affect main ques- tion	Yes	Yes	Yes	See note (10)	
Yes	Yes	Yes	No	See note (10)	

(13) Reconsider usually classed as "Miscellaneous" motion. It is in order at any time. Can be applied to every other question except adjourn and suspend rules, and affirmative vote on lay on the table.

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## OUTLINE HISTORY OF COUNTY EXTENSION WORK

### 1904

Fifteen men took up work of controlling cotton boll weevil in Texas, confining their work to no political unit.

### 1906

1. These same men were each stationed in a county and called county agents; their work consisted mainly in demonstrating methods of preventing the ravages of the boll weevil.
2. The general education board appropriated money for the teaching of improved farm practices through county-agent demonstrative methods, in Arkansas and Louisiana.
3. The legislature of one of the southern states also passed a law permitting the counties and towns to make appropriations in support of county agent work.
4. Boys' and Girls' Club Work started in an organized way in Wright County, Iowa, through the efforts of O. H. Benson, now in charge of the Boys' and Girls' Club Work throughout the country.

### 1910

1. County agent work was first discussed in the northern states particularly with reference to putting an agent in Broome county, New York.
2. Women county agents were established in the southern states especially for supervising girls' club work.

### 1911

The first county agent in the northern states began work in Broome county, New York.

### 1912

Organized boys' and girls' club work was started in the states of Indiana, Iowa and Washington.

### 1913

Organized home demonstration work started in the northern states late in the year.

### 1915

The first county club leader was employed by Hampden county, Massachusetts. The year around club program was adopted and the demonstration team idea promoted.

### 1917

Congress provided funds as a War Emergency measure for the employment of a county agent in every agricultural county in the United States.

## DIRECTORY OF STATE EXTENSION WORKERS

Director.....	C. Larsen
County Agent Leader.....	I. B. Johnson
Assistant County Agent Leader .....	W. W. Underwood
Assistant County Agent Leader .....	H. J. Boyts
State Home Demonstration Leader.....	Roberta McNeill
State Club Leader.....	Paul J. Scarbro
Assistant State Club Leader..	A. L. Haynes
Assistant State Club Leader....	Irene Dunne
Assistant State Club Leader Selma Rongstad	
Specialists—	
Agricultural Editor.....	G. A. Starring
Agricultural Engineering.....	R. L. Patty
Animal Disease.....	Dr. G. S. Weaver
Farm Management.....	
Horticulture.....	F. E. McCall
Livestock.....	J. C. Holmes
Short Courses.....	H. E. Dawes



# **DIRECTORY OF SOUTH DAKOTA COUNTY AGRICULTURAL AGENTS**

County	Name	Address
Aurora.....	Bushey, A. L.....	Plankinton
Beadle.....	Drake, O. P.,.....	Huron
Brown.....	Boardman, W. C.,.....	Aberdeen
Butte .....	.....	Belle Fourche
Clay.....	Skott H. E.,.....	Vermillion
Clark.....	Dexter, A. J.,.....	Clark
Codington..	Palm, A. W.,.....	Watertown
Day.....	Gunning, J. A.,.....	Webster
Deuel.....	Jones, D. C.,.....	Clear Lake
Dewey.....	Hermsted, Oscar...	Timber Lake
Douglas.....	.....	Armour
Edmunds...	Davis, Deane.....	Ipswich
Fall River..	Johnston, R. E.,....	Hot Springs
Faulk.....	Gilbert, C. J.,.....	Faulkton
Grant.....	Swedberg, J. I.,.....	Milbank
Haakon.....	Sanderson, H. M.,.....	Philip
Hamlin.....	Tompkins, A. W.,.....	Hayti
Hand.....	Anderson, O. L.,.....	Miller
Hanson.....	Mayland, Geo. R.,....	Alexandria
Hughes.....	Nelson, N. F.,.....	Pierre
Jackson....	Carl, L. M.,.....	Kadoka
Jerauld....	Rilling, H. E., Wessington Spgs.	
Kingsbury..	Lewallen, Dick.....	De Smet
Lake.....	Bibby, I. J.,.....	Madison
Lawrence..	Kumlien, W. F.,.....	Spearfish
Lyman.....	McCullough, H. D.,....	Kennebec
Mellette .....	.....	White River
Miner.....	Swanson, R. O.,.....	Howard
Minnehaha..	Kennard, Geo. B.,....	Sioux Falls
Moody.....	Wilson, H. B.,.....	Flandreau
McCook....	Winright, Geo. L.,.....	Salem
Pennington.	Smith, H. W.,.....	Rapid City
Roberts....	Buchanan, R. R.,.....	Sisseton
Spink.....	Hall, E. W.,.....	Redfield
Stanley....	White, H. D.,.....	Ft. Pierre
Turner.....	.....	Hurley
Union.....	Crandall, P. J.,.....	Elk Point
Walworth ..	Mills, Omer.....	Selby
Yankton....	Keck, D. L.,.....	Yankton



# **SOURCES OF AGRICULTURAL FILMS, SLIDES, CHARTS, ETC.**

## **FILMS:**

States Relations Service, U. S. D. A. . . . . Washington, D. C.  
 National Crop Improvement Committee . . . . . Chicago, Ill.  
 The Devoy Corporation . . . . . 1266 Marinina St., Chicago, Ill.  
 The Curtis Publishing Co. . . . . Philadelphia, Pa.  
 Percival K. Frawert Co., Inc. . . . . 151 West 42nd St., New York City  
 Hoover Suction Sweeper Co. . . . . North Canton, Ohio

## **SLIDES:**

Agricultural Extension Division . . . . . Brookings, S. Dak.  
 States Relations Service, U. S. D. A. . . . . Washington, D. C.  
 National Crop: Improvement Committee . . . . . Chicago, Ill.  
 International Harvester Co. . . . . Chicago, Ill.  
 Portland Cement Co. . . . . Chicago, Ill.  
 Victor Animatograph Co. . . . . Davenport, Ia.  
 McIntosh Stereopticon Co. . . . . Chicago, Ill.

## **CHARTS:**

Agricultural Extension Division . . . . . Brookings, S. D.  
 International Harvester Co. . . . . Chicago, Ill.

1881  
Jas. C. ... ..  
...

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**REQUIREMENTS OF STANDARD CLUB****Recommendations Made by Conference of  
Club Leaders, Boys' and Girls' Club  
Work, North and West, February  
15-22, 1918**

1. A standard club shall have a membership of at least 5, working on the same project.
2. There shall be a local club leader in charge during the club year.
3. There shall be a local club organization with the necessary officers and duties.
4. There shall be a definite club year program of work.
5. There shall be held at least six regular club meetings during the club year. The secretary shall be required to keep definite record of these meetings and also of the progress of each member.
6. A local exhibit shall be held annually.
7. There shall be a demonstration team which must give at least one public demonstration in its community.
8. At least 60% of the members must complete the project and file a final report with the State club leader.
9. A judging team shall be chosen by competition between the members.
10. An achievement day shall be held during the club year.
11. The club shall hold a membership in the farm bureau or other county club organization.
12. When the first four requirements have been met, it will be recommended that a standard club charter be issued. When all requirements have been met, a National Seal of Achievement will be recommended.

1871

1. The first of the year was a very cold day, with a heavy frost, and the wind from the north-east.

2. The second day was a fine day, with a clear sky and a gentle breeze from the south.

3. The third day was a very warm day, with a clear sky and a gentle breeze from the south.

4. The fourth day was a very cold day, with a heavy frost, and the wind from the north-east.

5. The fifth day was a fine day, with a clear sky and a gentle breeze from the south.

6. The sixth day was a very warm day, with a clear sky and a gentle breeze from the south.

7. The seventh day was a very cold day, with a heavy frost, and the wind from the north-east.

8. The eighth day was a fine day, with a clear sky and a gentle breeze from the south.

9. The ninth day was a very warm day, with a clear sky and a gentle breeze from the south.

10. The tenth day was a very cold day, with a heavy frost, and the wind from the north-east.

11. The eleventh day was a fine day, with a clear sky and a gentle breeze from the south.

12. The twelfth day was a very warm day, with a clear sky and a gentle breeze from the south.

13. The thirteenth day was a very cold day, with a heavy frost, and the wind from the north-east.

14. The fourteenth day was a fine day, with a clear sky and a gentle breeze from the south.

15. The fifteenth day was a very warm day, with a clear sky and a gentle breeze from the south.

16. The sixteenth day was a very cold day, with a heavy frost, and the wind from the north-east.

17. The seventeenth day was a fine day, with a clear sky and a gentle breeze from the south.

18. The eighteenth day was a very warm day, with a clear sky and a gentle breeze from the south.

19. The nineteenth day was a very cold day, with a heavy frost, and the wind from the north-east.

20. The twentieth day was a fine day, with a clear sky and a gentle breeze from the south.

21. The twenty-first day was a very warm day, with a clear sky and a gentle breeze from the south.

22. The twenty-second day was a very cold day, with a heavy frost, and the wind from the north-east.

23. The twenty-third day was a fine day, with a clear sky and a gentle breeze from the south.

24. The twenty-fourth day was a very warm day, with a clear sky and a gentle breeze from the south.

25. The twenty-fifth day was a very cold day, with a heavy frost, and the wind from the north-east.

26. The twenty-sixth day was a fine day, with a clear sky and a gentle breeze from the south.

27. The twenty-seventh day was a very warm day, with a clear sky and a gentle breeze from the south.

28. The twenty-eighth day was a very cold day, with a heavy frost, and the wind from the north-east.

29. The twenty-ninth day was a fine day, with a clear sky and a gentle breeze from the south.

30. The thirtieth day was a very warm day, with a clear sky and a gentle breeze from the south.

31. The thirty-first day was a very cold day, with a heavy frost, and the wind from the north-east.

**VALUE OF AN EDUCATION ON THE FARM**

The U. S. Department of Agriculture some time ago made a careful analysis of the yearly income of corn belt farmers who had no schooling, those who went to common school, those who went to high school, and those who went to college. The results showed the value of an education to be as follows:

	Value of each day spent in education	Total of value education
Common school education..	1.16	\$ 1,850
High school education.....	18.25	15,500
College education.....	30.70	25,000

## PRESERVING SPECIMENS FOR EXHIBIT OR DISPLAY

### FRUITS:

In preparing these fruits, it is desirable to use distilled water. Specimens are not edible. The fluids are good preservatives for fruits as suggested.

Fluid No. 1	Fluid No. 2	Fluid No. 3
Grapes (black)	Apples (red)	Apples (green and russet)
Currants	Plums	
Strawberries	Tomatoes	

### Fluid No. 1—Formaldehyde

Formaldehyde (formalin)..... 1 part  
 Alcohol ..... 5 parts  
 Water, to make ..... 50 parts

To prepare one gallon of the fluid  $3\frac{1}{2}$  ounces of formaldehyde and 16 ounces of alcohol will be required, the remainder of the gallon to made up with water.

The addition of a volume of hydrogen peroxide equal to that of the formaldehyde has been found to somewhat enhance the value of this fluid for red fruits.

### Fluid No. 2—Boric Acid

Boric (boracic) acid ..... 1 part  
 Alcohol ..... 5 parts  
 Water, to make ..... 50 parts

For one gallon,  $3\frac{1}{2}$  ounces of boric acid and 16 ounces of alcohol will be required.

The powdered form of boric acid is the most convenient to use. There is no necessity to employ hot water, but stirring should be continued until complete solution is effected.

### Fluid No. 3—Zinc Chloride

Zinc chloride ..... 3 parts  
 Alcohol ..... 10 parts  
 Water, to make ..... 100 parts

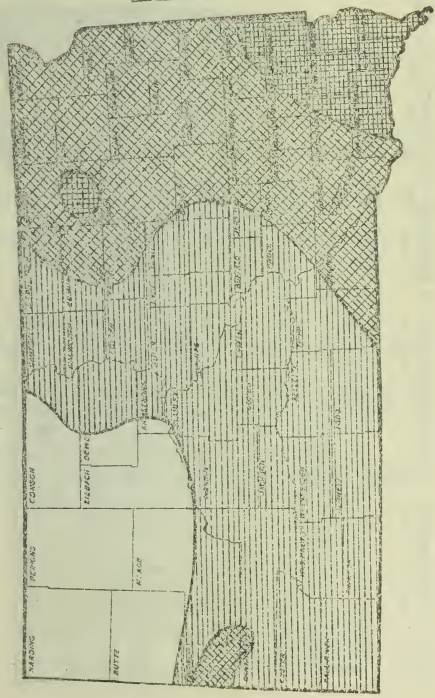
For one gallon of fluid, 5 ounces of zinc chloride and 16 ounces of alcohol will be required.

Zinc chloride, of good quality, passes readily into solution; any white, flocculent precipitate that may appear is allowed to settle out, and the clear fluid decanted.

Frank T. Shutt, Exp. Farm, Ottawa, 1911

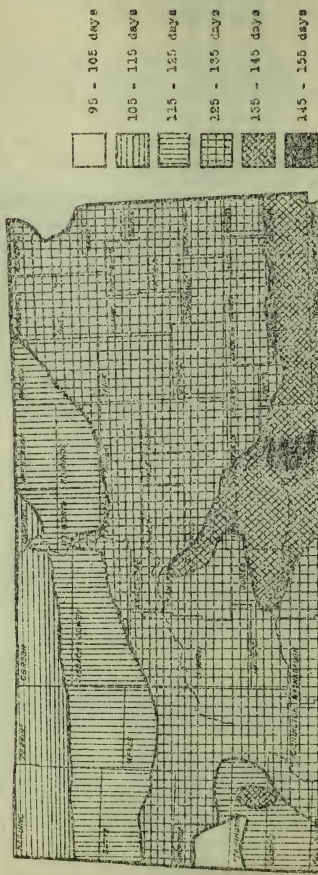
# **NORMAL ANNUAL PRECIPITATION** (Based on Records of U. S. Weather Bureau Covering Periods Ranging from 8 to 44 yrs.)

Less than 15 inches  
 From 15 to 20 inches  
 From 20 to 25 inches  
 More than 25 inches



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## 2. RURAL ECONOMICS

### 2.1 Farm Management

Features of South Dakota "Rural Credit Law."

Depreciation table for farm equipment

Weights and measures table

Capacities of tanks; board measure

Determining capacities of cribs, bins, etc.

Measuring hay in stacks

Cost of producing field crops

Labor on crops

### 2.2 Cooperation

Features of State Law on "Cooperative Associations"

Farmers' organizations with names and addresses of secretaries

Essentials in forming a cooperative organization

### 2.3 Marketing

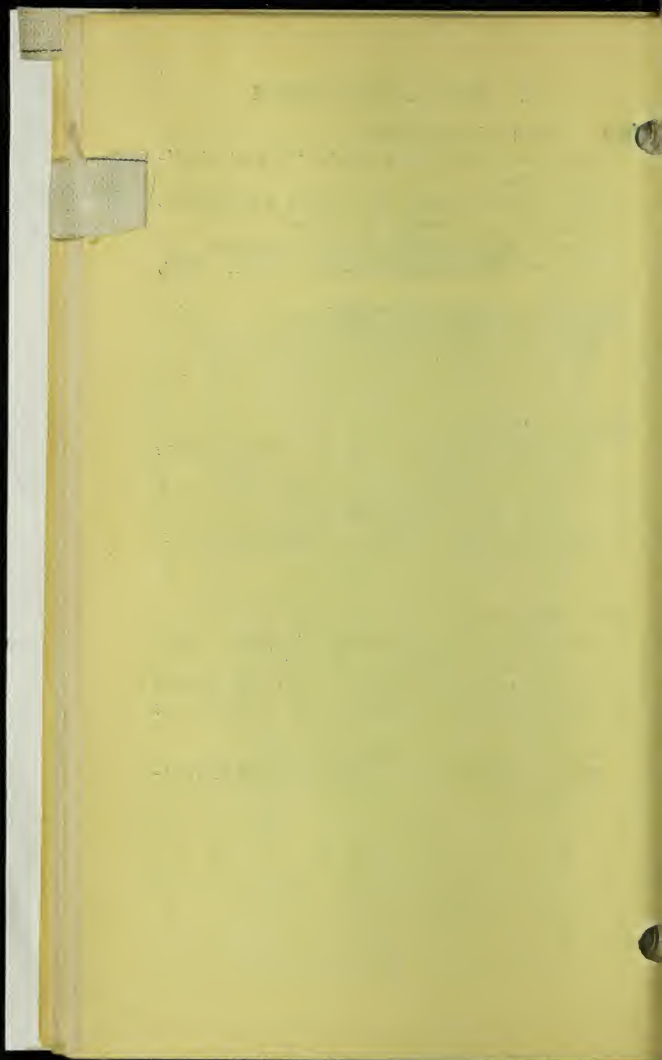
Essentials of a successful livestock shipping association

Market curves for hogs, cattle and sheep

Market price of potatoes in relation to yield

Directory of Commission firms

Type statistics for agricultural advertising



## FEATURES OF SOUTH DAKOTA RURAL CREDIT LAW

### Requirements For a Loan

1. The applicant must be the owner or prospective owner of farm land offered as security for loan, loans to be made on first mortgage only running to the state.
2. The applicant must be a person who is at the time, or shortly to become, engaged in the cultivation and development of the farm land mortgaged.
3. A loan to the extent of 70 per cent the appraised value of the land plus an additional amount of 40% of the insured value of its improvements, provided the improvements do not exceed 50 per cent the value of the land, nor an amount of \$5,000, and provided further that the total loan made shall not be in excess of the average assessed valuation for the three preceding years.
4. The money borrowed must be applied to certain definite uses, as follows:
  - (a) To provide for the purchase of farm lands;
  - (b) To provide for the purchase of equipment, fertilizers and livestock necessary for the proper and reasonable operation of the mortgaged land;
  - (c) To provide for buildings and other improvements on farm lands;
  - (d) To liquidate the indebtedness of the owner of the land mortgaged existing at the time of the organization of said Board, or indebtedness subsequently incurred for the purposes mentioned.
5. The smallest amount of loan which may be made is Five Thousand Dollars, the largest amount of loan which may be made is \$10,000.00. Interest is  $5\frac{1}{2}\%$ .

### Time of Loans.

1. Loans will be made for periods varying from 5 to 30 years, payable in fixed annual installments.
2. Loans may be paid up in whole or in part in any multiple of \$100 at any interest paying date after five years.
3. The following table shows the annual payments required to pay off interest and principal on a \$1,000 loan in from 10 to 30 years at  $5\frac{1}{2}\%$  percent interest:

10	years.....	\$132.67
15	years.....	99.63
20	years.....	83.68
25	years.....	74.55
30	years.....	68.81

## DEPRECIATION TABLES FOR FARM EQUIPMENT

(Wear, tear and exposure plus carelessness)  
Percent  
Annually

### Farm Buildings

Barn .....	3- 4%
Cattle Shed .....	5-10%
Corn crib, permanent .....	3- 6%
Corn Crib, movable .....	5-10%
Corn Crib, wire, slat, etc. ....	10-25%
Granary .....	3- 6%
Hen House, permanent wood..	3-3½%
Hen House, movable .....	4- 6%
Hog House, permanent .....	3- 5%
Hog House, movable .....	5-10%
Machine Shed .....	2- 7%

### Fences

Field woven wire, good quality, corner posts properly anchored	3- 6%
Barb Wire .....	4- 8%
Yards, woven wire .....	8-15%
Yards, board .....	10-15%

### Machinery

Automobile .....	12-40%
Bob Sled .....	5-10%
Buggy .....	6-12%
Corn Implements .....	7-16%
Cream Separator .....	7-14%
Disc .....	7-14%
Fanning Mill .....	6-10%
Feed Grinder .....	7-12%
Gas Engine .....	8-25%
Grain Binder .....	7-15%
Grain Drill .....	8-15%
Harrow, wood frame, spike tooth	8-14%
Harrow, steel frame, spike tooth	6-10%
Harrow, spring tooth .....	7-14%
Hay Rack .....	8-20%
Rake .....	6-10%
Stacker .....	8-15%
Sweep Rake .....	10-14%
Tedder .....	8-15%
Manure Spreader .....	7-18%
Mower .....	7-12%
Plows .....	6-15%
Potato Digger .....	9-14%
Planter .....	8-14%
Sprayer .....	7-14%
Silage Cutter .....	8-16%
Thresh Machine .....	7-25%
Tractor .....	12-30%
Truck .....	12-30%
Wagon, gear .....	8-12%
Box .....	8-15%
Work Harness .....	7-15%

## AMERICAN WEIGHTS AND MEASURES

## AVOIRDUPOIS: (Partial)

27 11/32 grains.....	1 dram
16 drams.....	1 ounce
16 ounces.....	1 pound

## APOTHECARIES:

## Weight

20 grains.....	1 scruple
3 scruples.....	1 dram
8 drams.....	1 ounce
12 ounces.....	1 pound

## Fluid

60 minims.....	1 fluid dram
8 fluid drams.....	1 ounce
16 fluid ounces.....	1 pint
8 pints.....	1 gallon
1 teaspoonful.....	1/6 oz
1 tablespoonful.....	1/2 oz

## DRY AND LIQUID

8 quarts.....	1 peck
31 1/2 gallons.....	1 barrel
2 barrels.....	1 hogshead

## Equivalents of American measures in metric terms:

## LENGTH

1 inch is	2.54 centimeters.
1 yard is	.9144 of a meter.
1 rod is	5.029 meters.
1 mile is	1609.3 meters.

## BULK

1 liquid pint is	.473 of a liter.
1 liquid gallon is	3.785 liters.
1 bushel is	35.24 liters.



## NUMBER OF GALLONS IN CIRCULAR TANKS AND WELLS

To find the contents in gallons of circular tanks, square the diameter in feet, multiply by the depth, and then multiply by 5.875.

## NUMBER OF GALLONS IN SQUARE TANKS

To find the number of gallons in any square or oblong tank, multiply the number of cubic feet it contains by 7.4805.

## BOARD MEASURE

The unit of measure is the board foot, which is a board one inch thick and one foot square. Lumber is always sold on the basis of 1000 feet board measure. (B. M.)

Formula: To find B. M. multiply the length in feet by the width and thickness in inches and divided the product by 12.

## DETERMINING CAPACITIES OF BINS, CRIBS, ETC., IN BUSHELS OF PRODUCTS

One cubic foot =  $\frac{4}{5}$  bushel of shelled corn, grain, potatoes, apples, etc. If the corn is in the ear, deduct one-third <sup>half</sup> from the result.

Square or oblong bins—Volume equals length  $\times$  width  $\times$  height.

Cylindrical bins—Volume equals  $3.1416 \times$  radius squared  $\times$  height.



## MEASURING HAY IN STACKS

### SOUTH DAKOTA METHOD:

South Dakota's law for measuring hay in stacks applies in all cases where no special agreement for measuring was made between the contracting parties as stated in Chapter 209 of the 1915 Session Laws.

(The overthrow is the distance in linear feet and inches from the ground on one side of the stack, directly over and opposite to the ground on the other side of the stack.)

#### Rick Stack

Obtain the number of cubic feet by subtracting the width from the overthrow, dividing the result by 2, multiplying this result by the width and this product by the length.

#### Round Stack

Obtain the number of cubic feet by multiplying the circumference (taken at base of stack) by itself and the product by the height and divide by 25.

The number of cubic feet of hay in a ton varies according to how long the stack has settled and the nature of the grass in the stack. Unless otherwise agreed upon the law specifies the following:

Nature of Hay	Cubic ft. of hay in a ton	
	Settled 30 to 60 days	Settled more than 60 days
Clean alfalfa .....	512	422
Clean timothy and clover .....	512	422
Clean native blue, joint, alkali or salt grass or wheat grass or mixed ....	422	343

### QUARTERMASTER METHOD:

Add the width of the stack to the overthrow, divide by 4, multiply the result obtained by itself and the product by the length which gives the number of cubic feet in the stack.

### DEPARTMENT OF AGRICULTURE METHOD:

This method is fully described in circular 67 of the Office of the Secretary of Agriculture. On account of the diagrams and formulas presented for a more accurate determination of the volume of haystacks, it is best to refer directly to this circular.

**COST OF PRODUCING FIELD CROPS, 1913-1917**  
**Compared With Five-Year Period, 1908-1912.**  
(Norman and Wright Counties, Minn.)

Crop	Cost per acre		Increase per acre over 1908-1912
	1913-1917	1908-1912	
Wheat, fall-plowed, stack-threshed .....	\$16.33	\$11.68	\$ 4.65
Oats, fall-plowed, stack-threshed .....	16.54	12.92	3.62
Barley, fall-plowed, stack-threshed .....	15.81	12.06	3.75
Rye, fall-plowed, shock-threshed .....	15.28	11.73	3.55
Corn, cut, shocked, and hauled from field .....	19.03	15.65	3.38
Corn, husked from standing stalks .....	19.28	15.42	3.86
Corn, cut, shocked, and husked from shocks .....	21.50	18.60	2.90
Corn, cut, shocked, and shredded .....	22.25	17.85	4.40
Fodder corn, cut, shocked and hauled .....	18.04	15.74	2.30
Silage, siloed .....	23.53	20.39	3.14
Potatoes, machine production .....	45.37	33.08	12.29
Hay, clover and timothy, first crop .....	11.22	7.51	3.71
Hay, millet .....	17.34	13.38	3.96
Hay, wild .....	8.67	7.30	1.37
Timothy seed .....	7.54	6.80	0.74
Clover seed .....	9.61	8.35	1.26

## LABOR ON CROPS

(Average annual hours of labor per acre required in producing Field Crops, Rice, Lyon and Norman Counties, Minnesota, 1902-1912).

CROP	Hours per acre	
	Man	Horse
Wheat, shock threshed ....	12.3	29.9
Oats, shock threshed .....	13.5	28.9
Barley, shock threshed ....	12.8	29.9
Fall rye, shock threshed...	10.3	27.2
Flax, stack threshed .....	13.7	33.8
Corn, husked .....	26.2	54.2
Fodder corn, cut shocked and stacked .....	30.4	52.6
Ensilage corn .....	32.6	59.8
Potatoes, machine production	44.4	75.0
Mangels .....	180.7	99.3
Hay, timothy and clover, first crop .....	12.3	13.
Hay, timothy and clover,, two cuttings .....	20.7	21.5
Hay, wild.....	12.2	16.9
Timothy, cut for seed.....	5.1	7.1
Clover, cut for seed .....	9.2	12.3
Hay, Millet .....	17.3	39.1
Hemp .....	14.3	27.4

Minnesota Agr. Exp. Station Bul. 179

1870

Month	Day	Particulars	Debit	Credit	Balance
Jan	1	Balance			100.00
Jan	2	...	...		...
Jan	3	...	...		...
Jan	4	...	...		...
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Feb	31	...	...		...

## FEATURES OF STATE LAW ON "CO- OPERATIVE ASSOCIATIONS"

1. It shall be unlawful for any person or organization to adopt or use the word "cooperative" as a part of its title or business name, unless it has complied with the provisions of the state law on "Cooperative Associations." Any violation of this is punishable by a fine of not more than \$1,000.00.

2. **Organization**—Any number of persons, not less than 5, may associate themselves together as a cooperative association. No member is entitled to more than one vote and if capital stock is issued, can not hold more than \$1000.00 par value of same.

3. **Articles of Incorporation**—Must set forth the name of the association, the names and residences of the persons forming it, the purposes and business of the association, the name of the town where its business is to be conducted, the amount of capital stock with number of shares it is divided into and par value of each share. The Articles should then be signed by all members and forwarded to the Secretary of State.

4. **Directors and Officers**—There shall not be less than 5 directors. The regular officers are elected by and from among the directors.

5. **Amendments**—When made to the Articles must be recorded with Secretary of State.

6. **Division of Profits**—Shall be apportioned by directors as follows:

(1) By paying not to exceed 10% interest on paid up capital.

(2) Then setting aside 10% net profits annually in a reserve fund until said fund is equal to paid up capital stock.

(3) Then setting aside an amount of from 1 to 5% net profits as an educational fund.

(4) The balance of net earnings shall be apportioned among patrons as provided in association's by laws, being apportioned as to amount of business transacted between Association and its patrons. When a non-stockholder's proportion equals par value of a share of stock he shall be issued a share.

**FARMERS' ORGANIZATIONS WITH NAMES AND ADDRESSES OF SECRETARIES**  
Name of Organization      Secretary      Address

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NATIONAL:

STATE:

COUNTY:



## ESSENTIALS IN FORMING A COOPERATIVE ORGANIZATION

1. Secure sufficient number farmers interested in the business of the proposed organization.
2. Call a meeting of those interested and transact necessary business as
  - (1) Election of temporary chairman and and secretary.
  - (2) Appointment of committees on constitution and by-laws, capital stock and shares, membership, etc.
  - (3) Committee reports.
  - (4) Adoption of constitution and by-laws.
  - (5) Filling out and signing of articles of incorporation.
3. File articles of incorporation with Secretary of State.
4. Sell necessary shares of capital stock.
5. General meeting of stockholders to—
  - (1) Elect Board of Directors.
  - (2) Proceed with business of organization.

## SUGGESTED OUTLINE FORM FOR CONSTITUTION AND BY-LAWS OF ANY ORGANIZATION

### CONSTITUTION: (signed by members)

Name  
 Objects or purposes  
 Membership or capital stock  
 Location  
 Officers and Directors:  
 (enumeration and election)  
 Quorum  
 Amendments

### BY-LAWS:

Meetings (when and where)  
 Officers and directors (duties)  
 Committees  
 Rules of Procedure  
 Vacancies  
 Withdrawals  
 Amendments

## ESSENTIALS OF A SUCCESSFUL LIVE-STOCK SHIPPING ASSOCIATION

### 1. ORGANIZATION

It may be on the basis of a \$1.00 annual membership fee.

A corporation may be formed, Chapter 170 of the 1916-1917 Session Laws gives the essentials for incorporation.

Board of Directors to be elected by the members or stock holders.

No capital stock is necessary.

Manager's duty is to prorate the receipts, expenditures and shrinkage of each shipment.

The manager should be compensated according to the work involved.

Reserve fund is necessary for reimbursing those who lose animals from death or injury in transit. One or two cents per hundred pounds is usually sufficient to cover loss.

### 2. MARKETING STOCK FOR SHIPMENT

By clipping Roman numerals with scissors on some conspicuous part of the animal.

By the use of paint that contains about 25 per cent varnish.

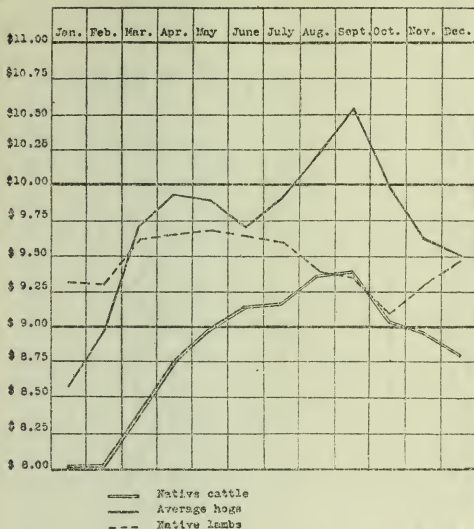
By use of numbered ear tags.

### 3. TIME OF SHIPPING

Certain days of the week may be set aside for the shipment of stock to market.

Assessments may be made on members for non-delivery of stock on date specified by them.

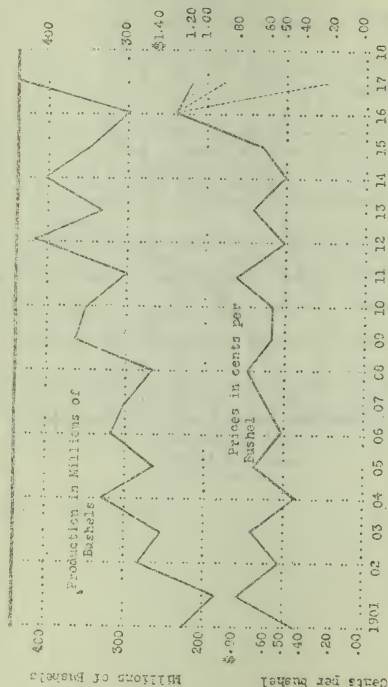
MARKET CURVES FOR CATTLE, HOGS AND SHEEP  
Chicago Market ---- 1909 to 1918



Data furnished by Wallace's Farmer

# PRODUCTION AND PRICE OF POTATOES IN U. S.

The upper line shows the total crop of the United States in millions of bushels for the year 1900 and for each succeeding year up to 1917. The lower line shows the average farm price of potatoes, December 1.



## DIRECTORY OF COMMISSION FIRMS

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## TYPE STATISTICS FOR AGRICULTURAL ADVERTISING

Newspaper columns are  $2 \frac{1}{6}$  inches wide. Farm paper and magazine columns vary in width, from  $2 \frac{1}{8}$  to  $2 \frac{1}{4}$  inches.

Estimate 40 to 50 words of copy to a column inch, depending on average length of words.

Engravings for newspaper use should not be ordered more than 100 lines fine. Some papers do better work with 65 to 80 line screen.

Advertising space may be figured by the inch or by the line. A line is an arbitrary unit of measurement, being  $\frac{1}{14}$  of an inch. Where line rates are quoted, multiply the rate by 14 to get the inch rate.

To determine the number of words that will go into advertising space, follow the following approximate estimates:

Size of Type	Words per Sq. In.
6 point solid.....	47
6 point leaded.....	34
8 point solid.....	32
8 point leaded.....	23
10 point solid.....	21
10 point leaded.....	16
12 point solid.....	14
12 point leaded.....	11

Type is usually set leaded.

In submitting news or advertising to a farm paper, ascertain when forms close, and send copy before that date. A week or ten days before date of issue is the rule for farm papers in this district.



### 3. HOME ECONOMICS

Meat Cuts

Formulas for Curing Meats

Preservation of Eggs

Sanitation facts

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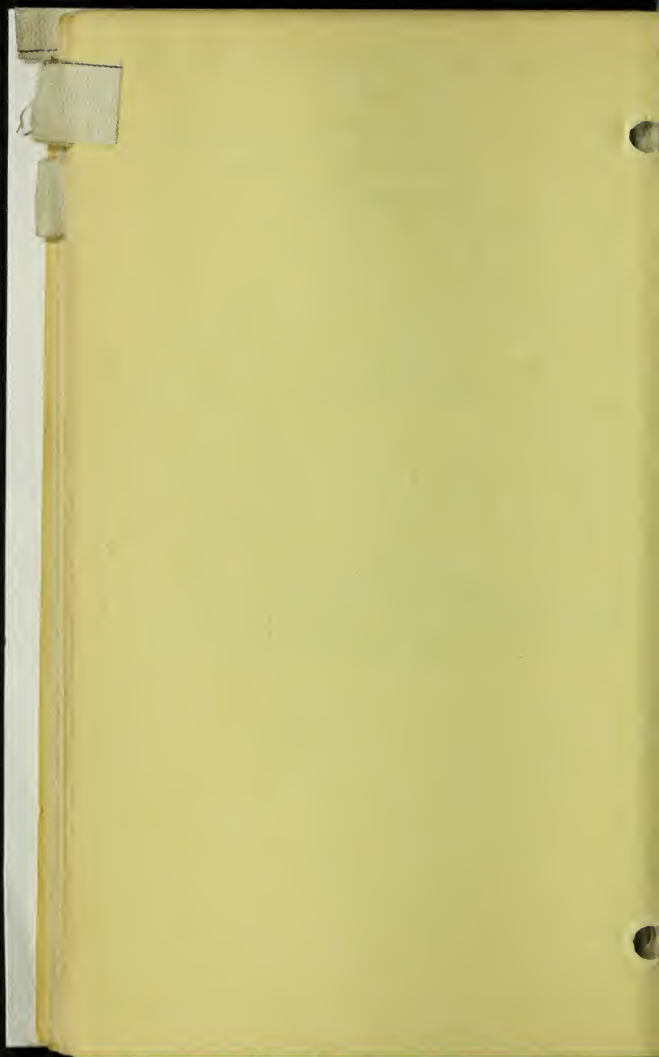
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## PRESERVATION OF EGGS

### WATERGLASS METHOD

#### Proportions

9 quarts soft water boiled and cooled, to which add 1 quart waterglass; stir thoroughly. Sufficient for 15 dozen eggs; use 6 gallon crock. Scald crock before using.

#### Method

Place eggs in solution allowing at least two inches of solution over eggs at all times.

Place crock containing preserved eggs in a cool, dry place, well covered to prevent evaporation. Waxed paper tied over top of jar will answer the purpose.

### LIME WATER METHOD

#### Proportions

2 or 3 pounds unslacked lime and 5 gallons water boiled and cooled.

#### Method

Pour water over the lime and allow to stand until mixture settles and the liquid is clear. Place clean, fresh eggs in a clean crock or jar and pour clear lime water over eggs. Allow two inches of liquid over top of eggs.

# 3 BEEF CUTS

CUT	CHARACTERISTICS	METHODS OF COOKING
<b>FORE QUARTER</b> Fore Shank	Upper part has little bone, solid meat, good flavor. Lower part tough with tendon and bone.	Three fairly good steaks or small pot roast. Remainder stews, hamburger, steak, sage and soup.
Brisket	Layer of juicy, well flavored meat over fat and bone.	Corned beef, soup, pot roast and stew.
Plate	Layers of fat and lean with bones in upper part.	Corned beef, pot roast and soup.
Neck	Bony, tough, well flavored.	Mince meat, stews and soup.
Chuck	Bottom part and hind end solid meat with comparatively little bone. More bone towards neck. Well flavored, some parts fairly tender.	Roasts or steaks (near ribs). Pot roasts, stews, casserole dishes and spiced beef.
Rib	Choice part of fore quarter. Contains 12 ribs and end of shoulder blade. 9th and 10th ribs choice portion. Lean muscle is large, solid and tender.	Oven roasts.

# BEEF CUTS

CUT	CHARACTERISTICS	METHODS OF COOKING
<b>HIND QUARTER</b> Flank	Practically boneless, coarse grained, fine flavored, no waste.	Flank steak, braized, pot pie, boiled and stewed.
Loin	Meat lean with fat on edges. Contains the choicest steaks, sirloin, pinbone and porterhouse.	Steaks and choice roasts.
Rump	Solid meat, somewhat coarse grained but fine flavored and juicy.	Steaks, corning braizing and pot roasts. Remove large bone, stuff and roast.
Round	Top round, solid piece of juicy, fairly tender meat. Bottom round separated from top by thick piece of fat, similar to top but tougher and streaked with gristle.	Steaks, fifth cut considered best. Roasts, hamburg and braized.
Hind Shank	Juicy but tough and full of tendons. Fine flavor.	Soup and stews.

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## FORMULAS FOR CURING MEAT

### CAUTIONS—

1. Kill and dress carefully.
2. Cool thoroughly before curing.
3. Do not cure meat when frozen or tainted.
4. Have vessels for curing tight and clean.

### CORNING BEEF

Select the cheaper cuts of beef; plate, rump, brisket, etc., preferably of fat animals. Cut into convenient sized pieces. Use 8 pounds of salt to 100 pounds of beef. Sprinkle  $\frac{1}{4}$  in. of salt over the bottom of barrel. Pack meat 5 or 6 inches in thickness over this. Alternate salt and meat layers, keeping a layer of salt for the top. Let stand over night and add 4 pounds of sugar, 2 ounces of baking soda and 4 ounces of saltpeter dissolved in 1 gallon of tepid water.

Three gallons more of water should be sufficient to cover this quantity. Weigh down so meat will be entirely under the brine. Meat should be in brine from 28 to 40 days to secure thorough corning.

Keep in a cool place to avoid fermentation.

If brine becomes ropy, turn off, wash meat and add fresh brine.

### DRIED BEEF

Round is usually used, the inside being considered the choice cut. Cut the round lengthwise of the grain so that the muscle fibres may be cut crosswise when sliced for table use.

#### Proportions:

100 pounds of beef, 5 pounds of salt, 3 pounds of granulated sugar, and 2 ounces of saltpeter. Mix thoroughly together.

Rub meat on all surfaces with a third of the mixture and pack it in the jar. Allow to remain for three days. Take out and rub with another third of the mixture putting top pieces on the bottom. Allow to remain three days and rub on remaining mixture and let stand three days. Do not remove liquid but repack in the liquid each time.

Remove from pickle, smoke and hang in dry attic or near the kitchen fire. Use any time after smoking.

### BRINE-CURED SALT PORK

Rub each piece of pork with fine salt and pack closely in a barrel. Let stand over night.

Make brine using 8 pounds of salt,  $2\frac{1}{2}$  lbs.



of sugar, 2 ounces of saltpeter and 4 gallons of boiling water for each 100 pounds of meat. Pour over meat when cold. Weigh down to keep under brine. Allow 4 days cure for each pound in hams and shoulders and 3 days for bacon and small pieces. When cured take out, wash in luke warm water and hang in smoke house.

#### DRY-CURED PORK

For 100 pounds of meat use:

7 pounds of salt.

2½ pounds of sugar.

2 ounces of saltpeter.

Mix the ingredients, rub one-third of mixture over meat, pack and let stand for three days. Rub another third and let it stand three days. Rub with rest of mixture and pack to cure. Allow 1½ days cure for each pound the pieces average.

Curing pork and meat to be smoked:

7 lbs. salt

3 lbs. sugar

2 ounces black pepper

2 ounces red pepper

Mix ingredients and rub onto meat; pack and leave for 6 to 7 weeks, then smoke.

#### PORK SAUSAGE

40 pounds of pork

10 pounds of beef

1 pound of salt

3 ounces of pepper

5 ounces of sage

5 pounds of water.

Grind meat through the coarse plate. Spread out on table and spread on the seasoning. Put through fine plate and add water and mix as bread dough until water is completely absorbed.

References:—F. B. 913, "Killing Hogs and Curing Pork."; F. B. 183, "Meat on the Farm, Butchering, Curing and Keeping."

## SANITATION FACTS

1. Pure air is one of the essentials to health. Stoves, kerosene, and gas lamps consume large quantities of oxygen and give off carbon dioxide. Therefore, when these are used special provision should be made for ventilation.

If no provision is made for ventilation the windows should be lowered and the house aired at least twice during the day and before going to bed. Bedroom windows should be open at night. Rooms should be kept clean and dust removed, not scattered.

2. Water carries many disease germs. Clear water is not necessarily pure water. If there is a question about the purity of water it should be boiled before being used.

3. Food should not be left exposed to dust. Meat, milk and eggs and other protein foods are very susceptible to the action of bacteria and special care should be taken to see that they do not spoil. Special care should be taken of milk that is fed to children.

### 4. Disposal of Waste.

(a) Sewage disposal. The sanitary disposal of sewage is one of our greatest needs. If the outside toilet must be used the vault should be abandoned for all time. In its place establish a metal receptacle which should be disinfected by lime or dry earth immediately after use. The metal receptacle should be emptied weekly during warm weather and contents disinfected and buried.

"The unsanitary privy has been in use so long that those used to it overlook its obvious dangers."

(b) Garbage. Garbage that can be used for feed should be kept by itself, disposed of frequently and the container washed and scalded. Garbage not fit for feed should be burned.

(c) Waste Water. Dispose of thru a drain if possible. If it must be thrown out, do so at some distance from the house and do not allow the ground to become wet and soggy.

(d) Tin Cans. Crush so that they will not hold water and become breeding places for mosquitoes. Dispose of at some distance from the house.

### 5. House Hold Pests.

(1) Flies. Flies carry filth and disease germs. Their favorite breeding place is manure and human excreta. To eliminate the fly:

- (a) Clean up breeding places.
- (b) Screen manure pits and out-door toilets.
- (c) Screen doors and windows.
- (d) Trap and kill any flies that may breed.

(2) Bedbugs. Eliminate by filling cracks and crevices and fumigating with sulphur or (H C N) hydrocyanic acid gas, the latter gas being very poisonous. Heating house to 150 degrees F for 2 hours is effective.

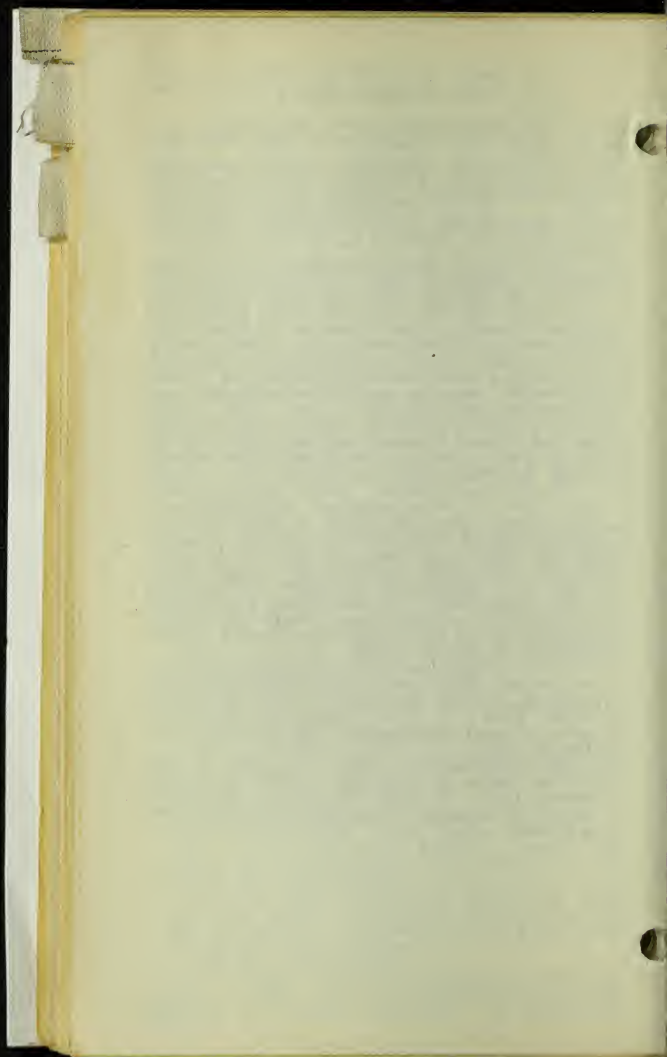
(3) House Ants. Eliminate by placing sodium arsenite solution about in small dishes or saturating a sponge with solution and placing in a jar with perforated cover. The solution is made by dissolving 3 grams sodium arsenite in a little water and adding it to a sweetened syrup of 2 lbs. sugar dissolved in  $\frac{3}{4}$  pint of water. If sodium arsenite cannot be obtained, use white arsenic instead.

The poison is slow acting and enables ants to carry it away to their nests where it is fed to young ants and the queen, thus destroying the whole colony.

(4) Clothes Moths. Store woolen goods and furs in cedar chests. Moth balls or flaked naphthalene added to stored woolen goods or furs tend to keep clothes moths away. Hang out clothes in sunshine and brush thoroughly before storing. If clothes are infested either take them out into the sunshine and brush thoroughly or fumigate house with sulphur or H C N gas or heat house to 150 degrees F for 2 hours.

(5) Weevils and other insects in flour, breakfast foods, etc. Heat material containing insects to 150° F. for 2 hours. Flour bins and other receptacles should be emptied and thoroughly treated with boiling water.

(6) Mosquitoes. Drain or fill in all water holes which are liable to breed mosquitoes. If this cannot be done, oil water or provide water with surface feeding fish.



## **4. FARM ENGINEERING**

### **4.1 Farm Buildings**

Lighting suggestions for barns  
Ventilation suggestions for barns  
Dimensions of stalls and pens  
Facts about the septic tank  
Facts about the ice house

### **4.2 Farm Machinery**

Tractor studies  
Threshing machine tests

### **4.3 Concrete**

Mixtures  
Proportioning mixtures

### **4.4 Drainage**

Five good rules of drainage  
Size of tile, fall required and capacities  
Preliminary estimate of tiling  
Capacity of car load lots of tile

### **4.5 Fences**

Longevity fence posts, treated vs. untreated

### **4.6 Roads**

Good roads facts

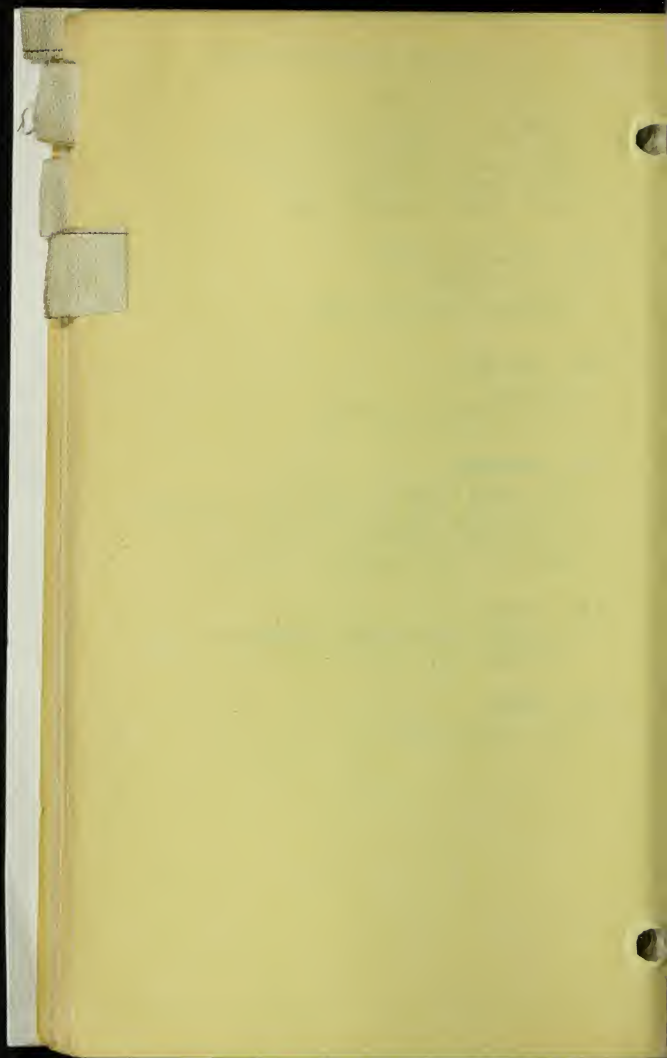
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**LIGHTING SUGGESTIONS FOR BARNs**

1. Sunshine is one of the best disinfectants.

2. A building located north and south can be lighted more effectively.

3. In practical building a barn should be so lighted that a newspaper may be read in any part.

4. Better lighting is secured when the longest dimension of the window is vertical rather than horizontal.

5. Not less than 3 square feet of window space for each animal is necessary for efficient lighting; in dairy barns allow one square foot of window space for each 20 square feet of floor space.

6. Skylights have been tried and found practical and highly satisfactory in hog houses.

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## VENTILATION SUGGESTIONS FOR BARNs

1. One of the best indications of an improperly ventilated barn is the condensation of moisture on the walls, ceilings and floors.

2. Ample ventilation is indispensable for maintaining the animal's power of disease resistance. A cow needs to be supplied with twice the weight of pure air that she does of food and water.

3. The essential parts of an effective ventilating system are:

(1) The inlets for fresh air—the total sum of their area should equal or exceed by 10% the area of the outlets.

(2) The outlets for foul air—these should be so constructed that their sides are air tight and afford complete insulation so that air within flue will not be cooled too rapidly.

(3) The aerator on top of the barn—so constructed that the action of the wind exerts a suction on the air in the outlet flue.

4. Rate of supply of air to barns to provide pure air for classes of livestock.

	Cu. Ft. Per Head Per Hour
Horses .....	4924
Cows .....	3953
Hogs .....	1510
Sheep .....	929
Hens .....	37

5. The following amount of out-take flue is required to keep the air in the building sufficiently pure for livestock.

	Head
Horses—1 sq. ft. cross-sectional area for	5
Cattle—1 sq. ft. cross-sectional area for	6
Hogs—1 sq. ft. cross-sectional area for	18
Sheep—1 sq. ft. cross-sectional area for	24
Hens—1 sq. ft. cross-sectional area for	400

# DIMENSIONS OF STALLS AND PENS

41

Kind	Box Stalls or pens (feet)	Tie Stalls	
		Length (feet)	Width (feet)
Horse			
Single .....	12x12	7*	5
Double .....		7	9
Cattle			
Beef (double) .....	10x12	5	8
Dairy average .....		5	(3½ with partition)
large .....		5½	(3 without partition)
small .....		4	
Sheep (ewe) .....	4x4		
Hogs (brood sow) .....	6x8		

\*Allow 15 feet from front of manger to back of litter alley. All floors in stalls should slope back toward gutter or drain not less than 1-4 to 1-3 inch to each foot. For cattle the gutter should be 16 inches wide and at least 4 inches deep on alley side and 8 inches on stall side.

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## FACTS ABOUT THE SEPTIC TANK

The simple septic tank is endorsed for disposal of farm home sewerage.

### DEPTH—

The depth of sewerage in the tank should be not less than 5 feet.

### CAPACITY—

The capacity of the sludge chamber should provide 10 gallons for each member of the household.

### LEACHING CAPACITY OF TILE—

When no open outlet can be had and blind tile lines are provided for taking care of the liquid effluent, 50 feet of tile should be provided per person in clay soil.

### SEWER PIPE—

Sewer pipe must always be used from the house to the tank. 4 inch tile is best. 4 inch drain tile is recommended for outlet to tank.

(Plans available)

## FACTS ABOUT THE ICE HOUSE

### CAPACITY—

The capacity of the ice house for refrigerator and milk should be 24 to 30 tons for the average.

### SHAPE—

The shape of the house should be as nearly cubical as possible.

### INSULATION—

From 12 in. to 18 in. of insulation around outside is recommended. Sawdust is best for insulation. Flax straw is better than other straws for insulation.

### TYPE—

The cheaper types of building for the ice house will probably prove more practical from the farm management standpoint. Expensively insulated walls are alright if the expenditure is desired. The semi basement house is giving good results.

### VENTILATION—

The ice house must be ventilated at the roof.

(Plan of house available)



# REDUCTION IN NUMBER OF HORSES NEEDED BY USE OF TRACTOR

42

Size of Tractor	Number of farms	Number of horses before purchasing	Number of horses after purchasing	Additional acres farmed
Two 14-inch plow .....	30	8	6	7
Three 14-inch plow .....	87	8	6	39
Four 14-inch plow .....	10	9	8	32

Minn. Agri. Extension Division, Special Bul. 31.



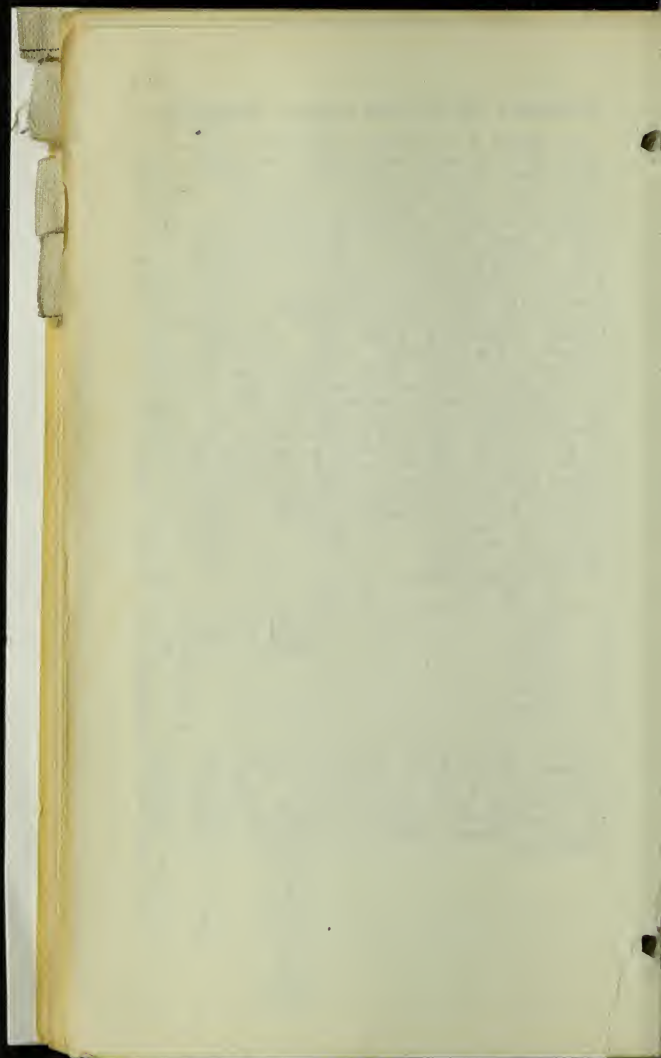
# BLANKET TEST FOR GRAIN THRESHING

To make a "blanket test," secure a sheet of canvas, or any other suitable cloth about 18x24 feet in area. Secure a coarse screen from 24 to 36 inches in diameter. Spread the sheet on the ground, convenient to the stacker of the thrashing machine and station a man on the top of the machine near the weighing device. Immediately after a trip of the weigher, drop the hood so that all the straw, etc., passes on to the sheet and allow the straw to deposit thereon until the weighing device trips five complete times, indicating that the machine has thrashed  $2\frac{1}{2}$  bushels. Use a fork to winnow off the straw from the canvas, shaking out as much as possible of any wheat therein. This leaves a mass of small particles of straw and chaff and wheat on the sheet. Use the screen to sift off the small particles of straw and put through a fanning mill to blow out the chaff, leaving the quantity of wheat that has been wasted. Measure this in pint measure and figure the percentage according to the following table:

Grain on blanket during five trips of weighing device, or $2\frac{1}{2}$ bu.		Per Cent Loss	
1	pint.....	Less than 1	%
2	pints .....	1 $\frac{1}{4}$	%
3	pints .....	2	%
5	pints .....	3	%
6 $\frac{1}{2}$	pints .....	4	%
8	pints .....	5	%
2	gallons .....	10	%

One pint in this operation might be considered unavoidable waste; two pints poor operation, to be corrected at the earliest opportunity; and three pints or more might be considered wasteful practice and the machine closed down until improvement is indicated.





## CONCRETE MIXTURES

The proportions of materials which have been found to produce satisfactory results under average conditions are one part cement, two parts of sand and four parts of coarse aggregate (expressed 1:2:4) for most classes of construction. The following table gives the proportions recommended for various classes of work:

1:2:3 mixture for:

One-course concrete highway, street, and barnyard pavements; one-course floors and walks; roofs; fence posts and for sills and lintels without mortar surface; water troughs and tanks.

1:2:4 mixture for:

Reinforced concrete floors, beams and columns; large engine foundations; work subject to vibration; building walls above foundation; silo walls.

1:2½:4 mixture for:

Base of two-course street and highway pavements. Backing of concrete block and similar cement products.

1:3:5 mixture for:

Supporting walls and foundations; small engine foundations; base of sidewalks and two-course floors; mass concrete footings, etc.

## MORTAR

(Cement and Sand)

1:1½ mixture for:

Wearing course of two-course floors.

1:2 mixture for:

Scratch coat of exterior plaster; facing blocks and similar cement products; wearing course of two-course walks, street, and highway pavements.

1:2½ mixture for:

Finish coat of exterior plaster; fence-posts when coarse aggregate is not used.

1:3 mixture for:

Concrete blocks when coarse aggregate is not used. Cement drain tile when coarse aggregate is not used.

**PROPORTIONING MIXTURES**  
 Showing Quantities of Materials and the Resulting Amount of Concrete for Two Bag  
 Batch  
 Cement, Sand, Stone or Gravel

Kind of Concrete Mixture	Proportions by Parts			Two-Bag Batch							Water in Gallons for Mixture Wet
	Cement	Sand	Stone or Gravel	Materials			Concrete (Cu. Ft.)	Size of Measuring Boxes. Inside Measurements.			
				Cement (Bags)	Sand (Cu. Ft.)	Stone or Gravel (Cu. Ft.)		Sand	Stone or Gravel		
1:2:4 Concrete ...	1	2	4	2	4	8	9	2'x2'x12"	2'x4'x12"	10	
1:2½:5 Concrete ..	1	2½	5	2	5	10	10.8	2'x2½'x12"	2'x5'x12"	12½	
Cement and Natural Mixture of Bank Sand and Gravel											
		Natural Mixture			Natural Mixture Cu. Ft.						
1:2:4 Concrete ....	1	4		2	8		9	2'x4'x11½"		10	
1:2½:5 Concrete ...	1	5		2	10		10.8	2'x5'x11½"		12½	

## DRAINAGE

### FIVE GOOD RULES OF DRAINAGE—

1. Use dense, hard-burned tile, round tile best.
2. Avoid tile smaller than five inches.
3. An even grade is essential.
4. Depth in heavy clay, two or three feet; in loam and sandy loam, three to four feet.
5. Carefully construct and protect the outlet.

### SIZE OF TILE, FALL REQUIRED AND CAPACITIES—

#### Size of Tile Required Depend Upon

- (a) The fall for the tile
- (b) The size of the basin to be drained.
- (c) The amount of rain fall
- (d) The nature of the soil.

#### Fall Required in Tile (minimum)

Small tile .15 percent up to 7 in. tile.

Large tile .10 percent above 7 in. tile.

Open ditch 3 feet to the mile.

# CAPACITY OF MAIN DRAINS AND LIMITS OF GRADIENT AND LENGTH (Removing $\frac{1}{4}$ inch water in 24 hours.)

Diameter	Fall in Feet per 100 Feet					Minimum	Limit of Length
	.1	.2	.3	.4	.5	Gradient per 100 feet	
Inches	Acres of Land Drained					Feet	Feet
5	15	18	22	24	28	.15	1500
6	24	30	35	42	47	.15	2000
5	32	42	50	59	67	.10	2300
8	50	60	72	84	94	.10	2500
9	60	78	100	115	130	.10	3000
10	80	110	130	150	170	.10	4000
12	140	170	200	230	260	.10	5300
14	200	250	300	340	390		
15	230	280	330	380	430		
16	260	340	420	480	530		
18	320	440	540	640	740		
20	480	590	700	810	920		
							1030

## PRELIMINARY ESTIMATE OF TILING:

Preliminary Estimate of Feet of Tile  
Required to Drain an Acre.

Laterals	Acre Requirement
50 feet apart.....	872 feet
100 feet apart.....	436 feet
150 feet apart.....	291 feet
200 feet apart.....	218 feet

The number of feet of drains per acre as shown does not include any intercepting main which may be necessary to make the work complete. For instance, should it be necessary to locate a main through the centre of a field, its length must be divided by the number of acres in the field, and the result added to the number which is found in the table above, opposite the number in the column indicating the distance apart which it is proposed to lay the drains. C. G. Elliott.

Cost of Laterals per Acre Drained—approximately \$35.00 for 1919.

CAPACITIES OF AVERAGE CAR LOAD OF  
TILE

Diameter tile (inches)	Pounds per foot	Capacity Car Load	
		Feet	Rods
5 .....	8	5,000	300
6 .....	11	4,000	240
7 .....	14	3,000	180
8 .....	18	2,400	144
10 .....	25	1,600	96
12 .....	33	1,000	60
14 .....	43	800	48
15 .....	50	600	36
16 .....	53	500	30
18 .....	70	400	24
20 .....	83	330	20
22 .....	100	320	19
24 .....	112	300	18
27 .....	150	240	15
30 .....	192	160	10



# ANNUAL COST AND LONGEVITY OF FENCE POSTS Treated and Untreated Woods

Kind of Post	Initial Cost Per Post	Cost of Creosoting	Annual Cost Per Post	Estimate yrs. Posts Will Last
Ash Untreated Creosoted	\$.10 .08	\$.085	\$.0408 .0245	6 25
Aspen Untreated Creosoted	.06 .04	.135	.0551 .0247	3 27
Boxelder Untreated Creosoted	.06 .04	.135	.0434 .0247	4 27
Mossy Oak Untreated Creosoted	.18 .16	.085	.0216 .0120	12 27
Catalpa Untreated Creosoted	.20 .17	.085	.0323 .0321	18 28



## GOOD ROAD FACTS

## CROWN FOR DIRT AND GRAVEL ROADS

Minimum crown 1 inch per running foot.  
Maximum crown  $1\frac{1}{2}$  inch per running foot.

Road bed—22 to 24 feet wide—3 to 1 slope to ditch on both sides of road bed.

## CULVERTS

Culverts should be placed on permanent grade. Size of culverts should be figured by an engineer with big factor of safety considered in size. State Highway Commission furnishes standard plans.

## GRADING ROADS—

Slip scraper—used for 100 ft. and under, Est. cost 45 to 50c per yd.

Fresno scraper—used for 100 ft. to 300 ft.—Est. cost 35 to 40c per yd.

Wheel scraper—used for 300 ft. to 500 ft.—Est. cost 35 to 40c per yd.

Dump wagon—used for 500 ft. to 1000 ft.—Est. cost 35 to 40c per yd.

## SHAPING ROADS

Blade Grader—Est. cost of moving dirt 12 to 15c per yd.

Elevating grader—Est. cost of moving dirt 8 to 10c per yd.

Cost of shaping dirt roads with grader \$50 to \$200 per mile.

Cost of gravelling roads—\$3,000 to \$5,000 per mile.

# FORCE REQUIRED TO DRAW A LOAD ON DIFFERENT KINDS OF ROADS

	Force Required to Draw a Gross Load of 2240 Pounds	Steepest Grade (rise per 100 ft) on which Vehicle will not Roll Back
Earth road .....	200	8.9
Gravel road .....	143½	6.4
Macadam road ...	65	2.9
Telford road .....	46	2.0
Plank road .....	41	1.8
Stone trackway ..	12½	.5

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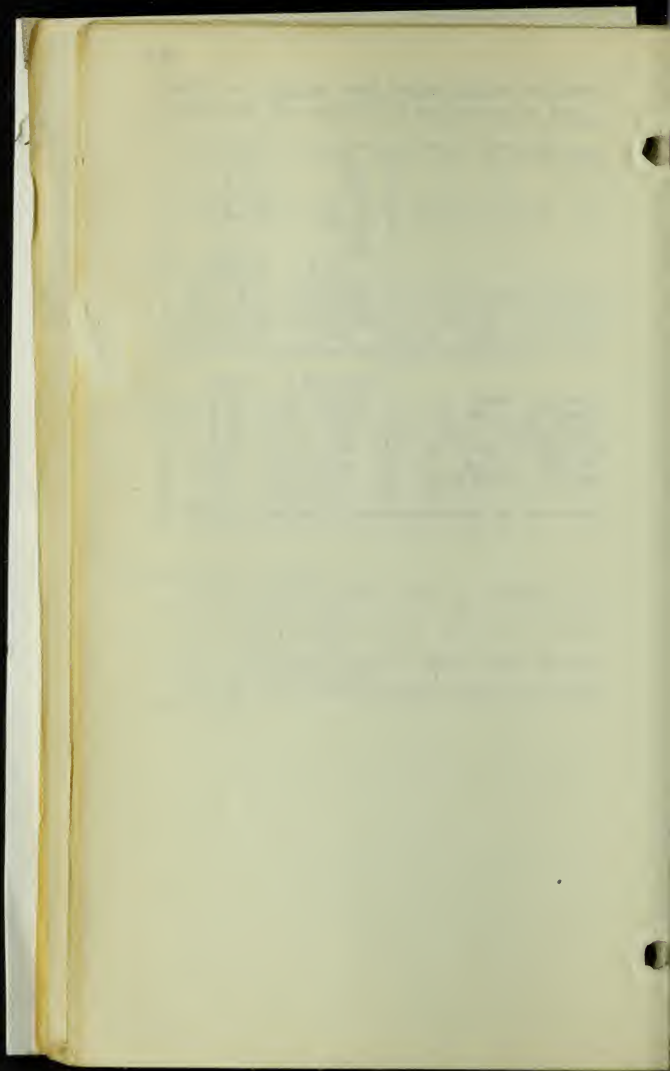
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## 5. SOILS

### 5.1 Compositions

Fertility content of some South Dakota soils

Experimental results with fertilizers in South Dakota

### 5.2 Rotations

Suggested crop rotations for South Dakota conditions.

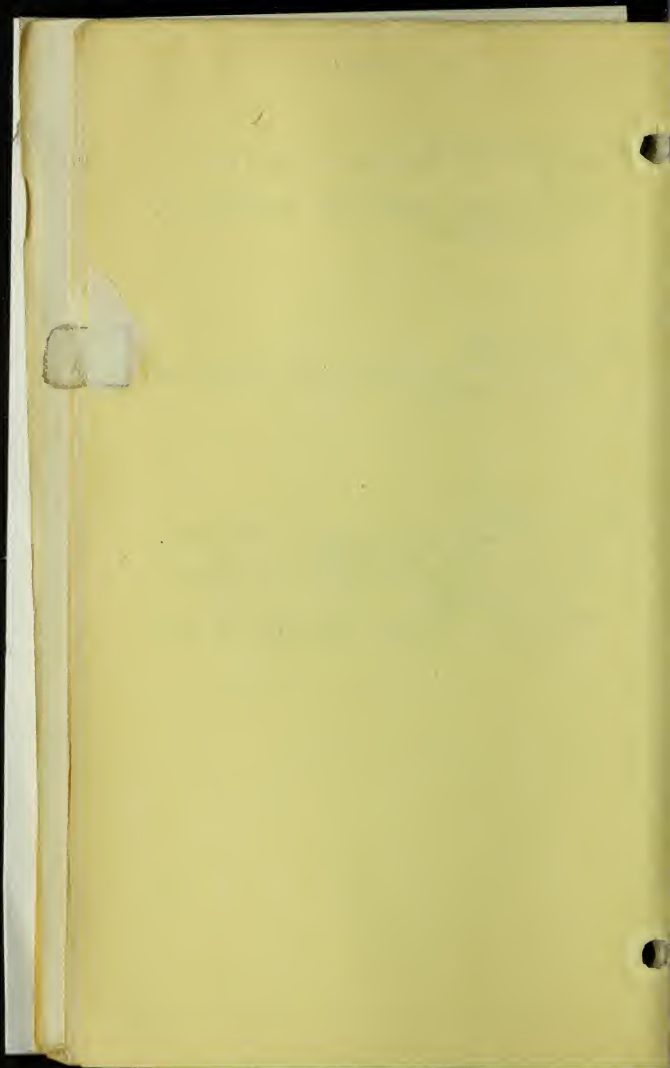
### 5.3 Fertility

Amount manure produced by livestock.

Fertility losses by leaching

Fertility content of crops, crop residues and manures

Conversion table for elements of fertility.





# FERTILITY CONTENT OF SOME SOUTH DAKOTA SOILS

(Pounds fertility in two million lbs. of surface soil or amount in an acre of soil 6 2/3 inches deep.)

	Nitrogen	Phosphorus	Potassium
Brookings Experiment Station			
Brown Sandy Loam .....	6,335	1,324	27,089
Cottonwood Experiment Station			
Pierre Clay .....	2,298	1,260	
Higmore Experiment Station			
Brown Sandy Loam .....	3,252	1,143	
Brown County			
Lake Dakota Silt .....	6,057	1,226	

## VALUE OF MANURE AND ROCK PHOSPHATE APPLICATIONS

(These results were obtained from farm tests in the eastern half of South Dakota in 1914, 1915 and 1917).

Acre Treatment	Average Acre Yield of Corn 1914, 15 and 17	Average Acre Yield Corn in 1914-15
No treatment .....	30.8 bus.	28.5
Manure (6 tons) .....	32.3 bus.	31.3
Manure (6 tons) + Rock Phosphate (600 lbs.) ..	35.5 bus.	34.2
Manure (6 tons) + Acid Phosphate (200 lbs.) ..		35.1

## **5.1**

### **EXPERIMENTAL RESULTS WITH FERTILIZERS IN SOUTH DAKOTA**

The effects of the application of the three most limiting elements of soil fertility, nitrogen, phosphorus and potassium have been tested out on crop rotations at the Experiment Station and substations of the state. Results of the past years indicate that it does not pay to buy nitrogen or potassium. A leguminous crop can be included in the rotation to add nitrogen to the soil. Phosphorus has given varying results at the different stations as follows:\*

#### **Brookings Station:**

During the past 11 years it has increased the average yield of the crops in rotation 30.2 percent.

#### **Highmore Substation:**

#### **Cottonwood Substation:**

#### **Eureka Substation:**

\*The data for the substations to be furnished in the latter part of 1919.

## SUGGESTED CROP ROTATIONS FOR SOUTH DAKOTA

### 3 yr. rotation:

Corn — wheat + (sweet clover) — sweet clover.

Corn — barley + (sweet clover) — sweet clover.

Corn — oats + (sweet clover) — sweet clover.

Corn — emmer + (sweet clover) — sweet clover.

### 4 yr rotation:

Corn — oats — wheat + (sweet clover) — sweet clover.

Corn — barley — wheat + (sweet clover) — sweet clover.

### 5 yr. rotation:

Corn — winter rye — corn — oats + (sweet clover) — sweet clover.

Corn — winter rye — corn — wheat + (sweet clover) — sweet clover.

corn — winter rye — corn — barley + (sweet clover) — sweet clover.

### Rotation With Perennials:

Alfalfa or any combination of perennials to be used as permanent crop either for meadow or pasture as desired.

Perennial, 3 to 9 years, for meadow.

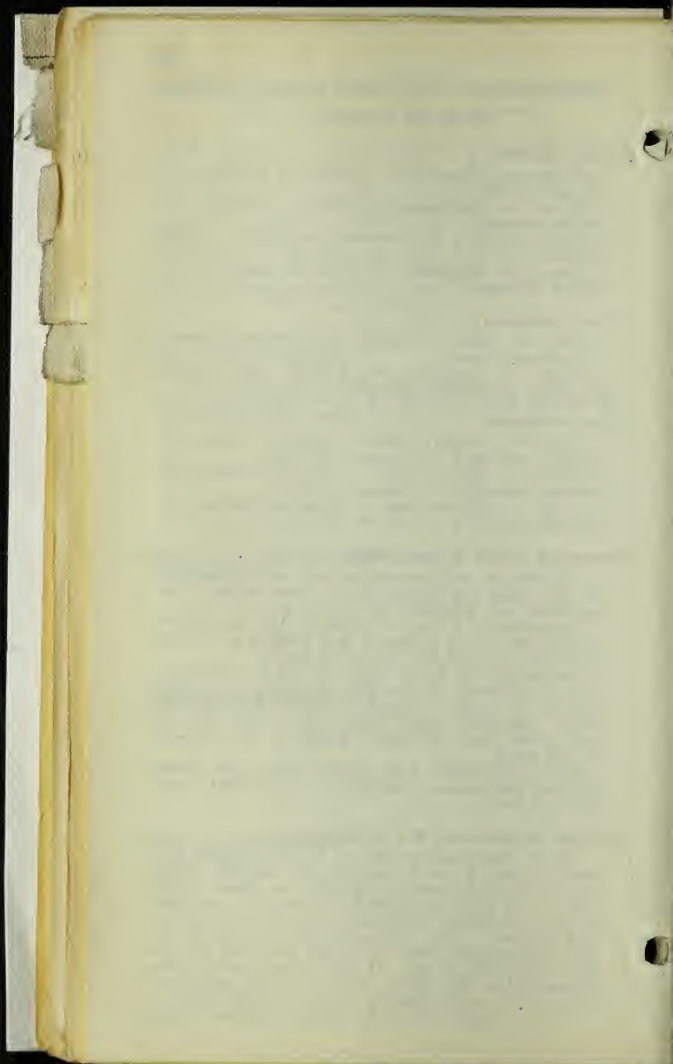
Perennial, 3 to 9 years for pasture. Corn, (barley, wheat or rye) and oats.

Perennial, 5 to 10 yrs. Corn — (barley, rye or wheat + sweet clover) — sweet clover — corn — oats. Seed more alfalfa when original field becomes poor, but do not plow the old field until a new stand is secured.

Note—Medium red clover may be used instead of sweet clover in southeast portion of state.

### Tillage Directions for Rotations:

Plow thoroughly six to eight inches for corn, plow 4 or 5 inches for grain after grain, double disk for grain or grass after corn. Do not be afraid to use the harrow in preparation for corn, grain or grain and grass. Put all available manure on ground where corn is to be planted six to ten tons per acre. If there is more than enough for the corn, use it on the meadow.



# APPROXIMATE AMOUNT MANURE PRO- DUCED BY LIVESTOCK

(Exclusive of Bedding)

	Lbs. manure per day per 1,000 lbs. live weight.*	Average number lbs. per animal during year.
Horse .....	50	25,550
Cow .....	70	27,375
Steers (fattening) .	40	
Hog .....	85	6,205
Sheep .....	30	1,314
Hen .....		75

\*Thorne's Farm Manures.

## PERCENTAGE LOSSES IN MANURE THROUGH LEACHING\*

(6 months period, spring and summer)

Kind Manure	Nitrogen	Phosphorus	Potassium
Horse ..	60	47	76
Cow ....	41	19	8

\*Thorne's Farm Manures.

## FERTILITY IN FARM PRODUCE\*

Produce or Material		Pounds		
Kind	Amount	Nitrogen	Phosphorus	Potassium
Produce—				
(Approximate amounts re-movable per acre annually)				
Corn, grain....	50 bu.	50.	8.5	9.5
Corn stover....	1½ T.	24.	3.	2.6
Corn crop....		74.	11.5	12.1
Oats, grain....	50 bu.	33	5.5	8.
Oats straw....	1¼ T.	15.5	2.5	26.
Oat crop....		48.5	8.	34.
Wheat, grain...	25 bu.	35.5	6.	6.5
Wheat straw...	1¼ T.	12.5	2.	22.5
Wheat crop..		48.	8.	29.
Soy beans.....	25 bu.	80.	13.	24.
Soy bean straw.	2¼ T.	79.	8.	49.
Soy bean crop.		159.	21.	73.
Timothy hay...	3 T.	72.	9.	71.
Clover seed....	4 bu.	7.	2.	3.
Clover hay....	4 T.	160.	20.	120.
Alfalfa hay....	6 T.	300.	27.	144.
Potatoes .....	200 bu.	42.	9.33	60.
Sugar beets....	20 T.	100.	18.	157.
Apples .....	600 bu.	47.	5.	57.
Leaves .....	4 T.	59.	7.	47.
Fat cattle .....	1000 lb.	25.	7.	1.
Fat hogs .....	1000 lb.	18.	3.	1.
Milk .....	10000 lb.	57.	7.	12.
Butter .....	400 lb.	.8	.2	.1

\*Hopkins' Soil Fertility and Permanent Agriculture.

# FERTILITY IN ROUGHAGE, MANURE AND FERTILIZERS

Produce or Material	Pounds per Ton		
	Nitrogen	Phosphorus	Potassium
Roughage**			
Corn stover . . . .	16	2	17
Oat straw . . . . .	12	2	21
Wheat straw . . . .	10	2	14
Clover hay . . . . .	40	5	30
Alfalfa hay . . . . .	50	4	24
Manure*			
Horses . . . . .	12	3	8.6
Cattle . . . . .	11	2.8	8
Hogs . . . . .	13	5.5	8
Sheep . . . . .	14	3.9	14
Poultry . . . . .	18	7.6	8
Barnyard manure	10	3	8
Fertilizers**			
Sodium nitrate..	310		
Raw bone meal.	80	180	
Acidated bone meal . . . . .	40	140	
Raw rock phosphate . . . .		250	
Acid phosphate .		125	
Wood ashes§ . . .		10	100

\*Thorne's Farm Manures.

§Wood ashes also contains approximately 1000 pounds of lime per ton.

\*\*Hopkins Soil Fertility and Permanent Agriculture.



CONVERSION TABLE FOR ELEMENTS  
OF FERTILITY

Amount of	Multiplied by	Give correspond- ing amount of
Nitrogen .....	1.215	..... Ammonia
Ammonia .....	.823	..... Nitrogen
Ammonia .....	5.15	..... Protein
Phosphorus .....	2.29	Phosphoric acid
Phosphoric acid..	.4366	.... Phosphorus
Potassium .....	1.204	..... Potash
Potash .....	.8303	..... Potassium

All fertilizers sold in South Dakota must show analysis in terms of nitrogen, phosphorus and potassium.

## 6. FIELD CROPS

Crop acreage, production  
and valuation in South  
Dakota.

Variety and planting table

Longevity of seeds

Features of the South Da-  
kota pure seed law

Number of hills or plants  
on an acre.

### 6.1 Cereals

#### 6.11 Corn

State corn districts and recommended  
varieties

Variety tests and approximate time  
for maturity

Seed corn selection and testing facts

Corn shrinkage in cribs

Market grades

#### 6.12 Wheat

Variety tests

Market grades

#### 6.13 Oats

Variety tests

Market grades

#### 6.14 Barley

Variety tests

Market grades

### **6.15 Rye**

Comparative yields winter rye vs.  
spring and winter wheat  
Market grades

### **6.16 Flax**

Variety tests  
Market grades

## **6.2 Forage Crops**

### **6.21 Legumes**

Classification of alfalfa varieties.  
Variety tests alfalfa for hay

### **6.22 Other than legumes**

Classification of sorghums

## **6.3 Root Crops**

Factors of successful storage

### **6.31 Potatoes**

Variety tests  
Size of seed potato pieces in relation  
to yield  
Market grades

## **6.4 Weeds**

Obnoxious weeds and their eradication  
Features of South Dakota weed law

**CROP ACREAGE, PRODUCTION AND ACRE VALUE IN SOUTH DAKOTA**  
(Comparing first war year 1917 with previous 10 year average 1907-16 inclusive)

	Acreage		Production in Bushels		Acre Yields (bushels)		Farm value per Bushel Dec. 1	
	1917	1907-1916	1917	1907-1916	1917	1907-1916	1917	1907-1916
Wheat .....	3,716,000	3,471,900	52,024,000	38,538,090	14	11.1	1.96	.92
Corn .....	3,350,000	2,457,500	97,150,000	67,335,500	29	27.4	1.20	.51
Oats .....	1,925,000	1,566,000	65,450,000	41,968,000	34	26.8	.61	.36
Barley .....	1,020,000	913,900	26,520,000	19,557,460	26	21.4	1.10	.56
Flax .....	140,000	456,100	980,000	3,831,280	7	8.4	2.99	1.54
Rye .....	350,000	61,380	5,600,000	1,018,908	16	16.6	1.55	.69
Total .....	10,501,000	8,926,780	247,724,000	172,250,038				

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FIELD CROPS—Variety and Planting Table

Crops and Varieties	Lbs. per Bu.	Lbs. per Acre	Seeding or Planting	
			Time	Depth in Inches
Alfalfa—	60	10	Early Spring	1
Broadcast		2		
In rows 3 ft. apart				
Baltic S. D. 167				
Vale S. D. 22			(registered common)	
Grimm S. D. 162				
Turkestan S. D. 240				
Common S. D. 12				
Cossack S. D. 38			(registered common)	
Barley—				
Eastern District				
Western District				
Manchuria S. D. 105	48	72	Early Spring	2-3
Odessa S. D. 182				
Hannchen S. D. 20				
White Smyrna S. D. 28				
Gatami S. D. 122			Late May	2-3
Beans—	60	20-30		
White Navy				
Manchuria Soys				
Buckwheat—	48	24-30	Early June	2
Japanese				
Silver Hull				
Corn—				
(for varieties see districts under corn)	56		May 10 May 15 May 20	2
First District				
Second District				
Third District				





FIELD CROPS—VARIETY AND PLANTING TABLE (Continued)

Crop and Varieties	Lbs. per Bu.	Lbs. per Acre	Seeding or Planting	
			Time	Depth in Inches
Upland (Eastern Section)				
{ Timothy		6		
{ Blue Grass		14		
{ White Clover		4		
Meadow—				
Dry Land			Early Spring	1
Brome		8		
Alfalfa		6		
Wet Land				
Timothy		6		
Red Top		8		
Alsike Clover		4		
Upland (Eastern section)				
Timothy		8		
Red Clover		6		
Sorghum		50	Late May	1
Forage—Minnesota Amber S. D. 341		6		
Dakota Amber S. D. 887		6		
Sudan Grass		25		
Grain				
Kaoliang—Altamont S. D. 655*		5		
Manchur Brown S. D. 289				

Millet— Shelley S. D. 343 Dakota Kursk S. D. 932 Kursk S. D. 79	50	25	Late May	1
Oats— Sixty Day S. D. 165 Silvermine S. D. 932 Swedish Select S. D. 112	32	48-64 64-80 64-80	Early Spring	2-3
Peas— Canadian Field	60	120	Early Spring	2
Potatoes— <b>Early</b> Irish Cobbler Early Ohio	60	600- 720	Early potatoes in late May. Late potatoes in early May	5
<b>Late</b> Rural New Yorker Guerney's Bugless Carmen No. 3 Burbank Raleigh				
Proso— Tambox S. D. 80 Black Vornouezh S. D. 93	50	25	Late May	1
Rape—Dwarf Essex Rye—(winter)— Advance S. D. 1030	60	4-5	April	1½
Wheat— Spring— <b>Common</b> Marquis S. D. 515 Kubanka S. D. 75 (beardless) Preston S. D. 67 Pierson S. D. 999 (bearded)	56	70	Sept. 15	2-3
	60	60-75	Early Spring	2-3
		Common 60-75 Durum 75-90		
			Early Spring	2-3

FIELD CROPS--VARIETY AND PLANTING TABLE (Continued)

FIELD CROPS--VARIETY AND PLANTING TABLE (Continued)					Depth in Inches
Crop and Varieties	Lbs. per Bu.	Lbs. per Acre	Seeding or Planting		
			Time		
Acme S. D. 284 (bearded)			75	Sept. 1-15	2-3
Winter— Turkey S. D. 144 Kharkof S. D. 191 (bearded)					
Combination of Crops— Oats and Canadian Field Peas		32 + 60		Early Spring	
Beardless or Hulless Barley and Peas		50 + 60		Early Spring	
Beardless or Hulless Barley and Rape		50 + 3		Early Spring	
Beardless or Hulless Barley and Rape		56 + 3		Early Spring	
Oats and Rape		56 + 3		Early Spring	
Winter Rye and Rape (spring sown)		4 + 5			
Rape in corn after last cultivation		15 + 14		May 15-25	
Soy beans in Corn					

# LONGEVITY OF SEEDS SHOWING AVERAGE YEARS VIABILITY\*

<b>Field Crops</b>		Millet .....	2
Alfalfa .....	3	Oats .....	3
Barley .....	3	Rape .....	5
Buckwheat .....	2	Rye .....	2
Clover .....	3	Sorghum .....	2
Corn .....	2	Wheat .....	2
Flax .....	2		
<b>Grasses—</b>			
Brome .....	3		
Kentucky Blue .....	3		
Orchard .....	3		
Red Top .....	3		
Timothy .....	4		
<b>Garden Crops</b>		Parsley .....	3
Bean .....	3	Pea .....	3
Beet .....	6	Pumpkin .....	4
Cabbage .....	5	Radish .....	5
Carrot .....	4	Rutabaga .....	
Cauliflower .....	5	Salsify .....	2
Celery .....	8	Squash .....	6
Cucumber .....	6	Tomato .....	4
Egg plant .....	6	Turnip .....	5
Lettuce .....	5	Watermelon ....	6
Muskmelon .....	5		
Onion .....	2		
Parsnip .....	2		
<b>Weed Seeds</b>		Smartweed .....	
Burdock .....		Thistle—	
Cocklebur .....	7	Bull .....	
Dandelion .....	2	Canada .....	
Dodder .....	7	Russian .....	
Fennel .....	4	Wild Mustard ..	7
Fox Tail .....		Wild oats .....	7
Jimson weed ....		Wild parsnip ...	
Morning glory..			
(field bindweed)			
Quack grass ....			
Purslane .....	7		
Ragweed .....			
Sheep sorrel .....			

\*The foregoing are averages; there may be extremes showing a greater number of years.

# FEATURES OF SOUTH DAKOTA'S PURE SEED LAW Standard of Purity and Germination of Agricultural Seeds included in the Law.

Name	Per Cent of Purity	Per Cent Germinable Seeds
Alfalfa ( <i>Medicago sativa</i> )	96	80
Barley	98	90
Blue Grass, Canadian ( <i>Poa compressa</i> )	90	45
Blue Grass, Kentucky ( <i>Poa pratensis</i> )	80	45
Brome, awnless ( <i>Bromus inermis</i> )	90	75
Clover, Alsike ( <i>Trifolium hybridum</i> )	90	75
Buckwheat	96	90
Clover, crimson, ( <i>Trifolium incarnatum</i> )	98	85
Clover, red ( <i>Trifolium pratense</i> )	92	80
Clover, white ( <i>Trifolium repens</i> )	90	75
Corn, field ( <i>Zea mays</i> )	99	90
Corn sweet	99	75
Fescue, meadow ( <i>Festuca pratensis</i> )	95	85
Flax ( <i>Linum usitatissimum</i> )	96	89
Millet, common ( <i>Setaria italica</i> )	90	85
Millet, hog, ( <i>Panicum miliaceum</i> )	90	85
Millet, pearl ( <i>Penisetum typhoideum</i> )	99	65
Oats ( <i>Avena sativa</i> )	98	90
Oat grass, tall ( <i>Arrhenatherum avenaceum</i> )	72	70
Orchard grass ( <i>Dactylis glomerata</i> )	70	70
Rape ( <i>Brassica rapa</i> )	99	90
Redtop ( <i>Agrostis alba</i> )	90	70

Rye (Secale cereale) .....	98
Rye Grass, Perennial (lolium perenne) .....	90
Rye Grass, Italian (lolium italicum) .....	95
Sorghum (Andropogon sorghum) .....	80
Sorghum, for fodder .....	90
Timothy (Phleum pratense) .....	85
Wheat (Triticum) .....	90

#### Labeling:

Each package or lot of agricultural seeds exceeding one pound in weight which is sold or offered for sale by any person, firm or corporation in the state shall be labeled as follows:

1. The commonly accepted name of the kind and variety of seed.
2. Full name and address of party making the sale.
3. Statement of purity of the seed contained specifying approximate percentage of impurities and naming the noxious weeds as quack grass, dodder and Canada thistle.
4. Germination test made within one year preceding date of sale.
5. When mixed seeds for lawn or other purposes are sold or offered for sale also include on the label the names of the kinds

of varieties of seeds composing the mixture.

#### Law does not apply to:

1. The growing or selling seeds for food or manufacturing purposes.
2. Seeds in transit.
3. Any seeds sold and delivered direct where the buyer has full and free privilege of examination before paying for the seed and voluntarily accepts it without requiring label as specified.

#### Penalty:

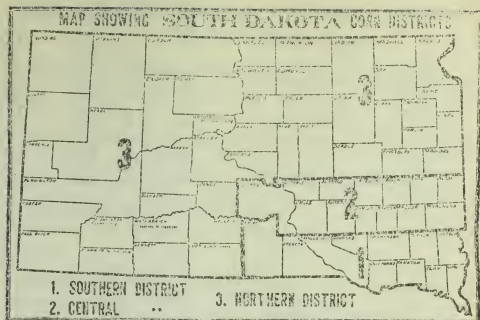
Whoever violates any provisions of the seed law shall be guilty of a misdemeanor and in addition thereto shall be liable in damages to the purchaser of the seed for the purchase price thereof. It shall be the duty of the state's attorney to prosecute all persons found violating any of the provisions of the law.



NUMBER OF HILLS OR PLANTS ON AN ACRE  
Varying Distances

Dis- tance	10 in.	12 in.	15 in.	18 in.	20 in.	2 ft.	2½ ft.	3 ft.	3½ ft.	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
in.														
10	62726													
12	52272	43560												
15	41817	34848												
18	34848	29040	27878	19360										
20	31363	26136	20908	17424	15681									
ft.														
2	26136	21780	17424	14520	13068	10890								
2½	20908	17424	13939	11616	10454	8712	6969							
3	17424	14520	11616	9680	8712	7260	5808	4840						
3½	14935	12446	9953	8297	7467	6223	4976	4148	3565					
4	13068	10890	8712	7260	6534	5445	4356	3630	3111	2722				
4½	11616	9680	7744	6453	5808	4840	3872	3226	2767	2420	2151			
5	10454	8712	6969	5808	5227	4356	3484	2904	2489	2178	1936	1742		
5½	9504	7920	6336	5230	4752	3960	3168	2640	2263	1930	1760	1584	1440	
6	8712	7260	5808	4840	4356	3630	2904	2420	2074	1865	1613	1452	1320	1210





### RECOMMENDED VARIETIES OF CORN

Southern Half	Northern Half
<b>District No. 1</b>	
Reid's Yellow Dent	Wimble's Yellow Dent
Wimble's Yellow Dent	Fulton's Yellow Dent
Rainbow Flint*	Minnesota 13
	Silver King
	Rainbow Flint*
<b>District No. 2</b>	
Minnesota 13	Minnesota 13
Fulton's Yellow Dent	Dakota White
Rainbow Flint*	Rainbow Flint*
Silver King	Big Squaw*
	Silver King
	Golden Glow
<b>District No. 3</b>	
Northwestern Dent	Northwestern Dent
Minnesota No. 13	Longfellow Flint*
Dakota White	North Dakota White
Rainbow Flint*	Flint*
Smutnose Flint*	Big Squaw*
Golden Glow	
Silver King	
Big Squaw*	

\*—Recommended for silage and hogging off.

## COMPARATIVE YIELDS OF VARIETIES OF CORN

Variety	Approximate Number Days for Maturity— Planting to Ripening.	Yield in Bushels per Acre*					
		Brookings 1914-16 inc.		Highmore		Cot'wd 1915-16	
		Bus Grain	Tons Silage	Bus. Grain 1912-1915	Tons Silage 1914-1915	Tons Silage	Bus Grain Eureka
Dent Corn—							
Reid's Yellow .....	135-150		13.9				
Wimble's Yellow .....	130-145	50					
Fulton's Yellow .....	125-140						
Minnesota 13 (yellow) .....	120-135	61.9	12.9	19.7	8.9	3.02	34.6
Silver King (Wis. 7) (white) ..	120-135	60.6	13	18.2	13.1	2.12	6.89
Dakota White .....	120-135	57	15.7				
Golden Glow .....	120-135	55.8	11.8	18	9.9	3.27	10.7
Northwestern (reddishbrown)	100-115	53.5	15				
Flint Corn—							
Big Squaw (reddish brown) ..	110-125	89.8	22			2.46	39.6
Rainbow (blue white) .....	120-135	72	20.9			2.26	52.3
Smutnose (varied) .....	110-125						
Longfellow (red) .....	100-115	61.6	19				
North Dakota White .....	110-125						

\*South Dakota Bul. 181

## ADDITIONAL FACTS IN SEED CORN SELECTION

(Purdue Agri. Exp. Station Bul. 224)

1. For permanent corn improvement only ears from disease-free stalks should be used for seed purposes.

2. For seed corn purposes no infested and weakened ears should be planted. These can be detected and discarded before planting by a careful study of the germinating seedlings in the germination test. The seedlings with rotted embryos and stalks indicate the ears to be discarded for seed purposes.

3. The planting of seed corn infected with disease-producing organisms is in a great measure responsible for missing hills, slow growing stalks, barren stalks, down stalks, nubbins and early blighting of plants in the field with the large reduction in yield which these conditions bring about.

## CORN SHRINKAGE IN CRIBS

Ten year average. Percentage by months.  
Iowa Exp. Station.

Month	Average Shrinkage	Monthly Rate
November .....	5.2	5.2
December .....	6.9	1.7
January .....	7.5	.6
February .....	7.8	.3
March .....	9.7	1.9
April .....	12.8	3.1
May .....	14.7	1.9
June .....	16.3	1.6
July .....	17.3	1.0
August .....	17.8	.5
September .....	18.2	.4
October .....	18.2	.0

## MARKET GRADES OF SHELLED CORN

## Classes

Shelled corn shall be divided into three classes:

**White Corn:** At least 98 per centum by weight of the kernels are white. A slight tinge of light straw color or of pink on kernels of corn otherwise white shall not affect their classification as white corn.

**Yellow Corn:** At least 95 per centum by weight of the kernels are yellow. A slight tinge of red on kernels of corn otherwise yellow shall not affect their classification as yellow corn.

**Mixed Corn:** Consists of corn of various colors not coming within the limits for color as provided in the definitions of white corn and yellow corn. White capped yellow kernels shall be classified as mixed corn.

## Grade Requirements

	Minimum test weight per bu.	Maximum limits of—			
		Moisture	Foreign material and cracked corn	Damaged corn	
				Total	Heat damage
	Lbs.	%	%	%	%
1....	55	14.0	3	2	.0
2....	53	15.5	3	4	.1
3....	51	17.5	4	6	.3
4....	49	19.5	5	8	.5
5....	47	21.5	6	10	1.0
6....	44	23.0	7	15	3.0
Sample					

Sample grade shall be White corn or Yellow corn, or mixed corn, respectively, which does not come within the requirements of any of the grades from No. 1 to No. 6.

All determinations except color, damage and heat damage shall be upon the basis of the grain including foreign material and cracked corn.

(1) The corn in grades Nos. 1 to 5 inclusive, shall be cool and sweet.

(2) The corn in grade No. 6 shall be cool, but may be musty or sour.

# COMPARATIVE YIELDS OF VARIETIES OF WHEAT<sup>1</sup>

Species and Variety	Yields in Bushels per Acre			
	Brookings 1905-1916	Highmore 1905-1916	Cottonwood 1909-1916	Eureka 1913-1916
Durum Kubanka S. D. 75 (bearded)	16.8	16.2	3.	20.8
Preston Preston S. D. 67 <sup>2</sup> (bearded)	16.7	13.5	2.6	11.8
Fife Marquis S. D. 515 <sup>3</sup> (bearded)	19.3	16.4		17.5
Bluestem Haynes S. D. 169 (bearded)	12.7	11.5	1.2	8.5

Wheat Cir., Agronomy Dept.,  
S. D. State College

1. At Highmore a new rust resistant variety, Acme S. D. 284, has been developed. In 3 years trials it yielded 27.9 bushels per acre as compared with 21.7 bushels for Kubanka 75.

2. Commonly called Velvet Chaff, Johnson, Bearded Red Fife or Climax.

3. Average yields 1913 to 1916 for Brookings, Highmore and Eureka.

## MARKET GRADES OF WHEAT—(Tabulated and Abridged)

Grade No.	Minimum limits of test weight per bushel		Moisture	Maximum limits of—				Wheats of other classes					
	test weight per bushel			Damaged kernels	Foreign Material other than dockage	Total							
	Classes: Hard Red Spring	Classes: Durum, Hard Red Winter, Common White & White Club; Sub-class Red Winter	Subclass: Red Walla	Class: Hard Red Spring and Durum	Classes: Hard Red Winter, Soft Red Winter, Common White and White Club	Total	Heat Damage	Total	Matter other than cereal grains	Total	%	%	%
1.....	58	60	58	14.0	13.5	2	0.1	1	0.5	5			
2.....	57	58	56	14.5	14.0	4	0.2	2	1.0	10			
3.....	55	56	54	15.0	14.5	7	0.5	3	2.0	10			
4.....	53	54	52	16.0	15.5	10	1.0	5	3.0	10			
5.....	50	51	49	16.0	15.5	15	3.0	7	5.0	10			
Sample Grade.—Shall be wheat of the appropriate subclass which does not come within the requirements of any of the grades from No. 1 to No. 5 inclusive.													

Sample Grade.—Shall be wheat of the appropriate subclass which does not come within the requirements of any of the grades from No. 1 to No. 5 inclusive.



**OAT VARIETIES AND THEIR ACRE  
YIELDS IN SOUTH DAKOTA**

Variety	Brookings 1903-1916	Highmore 1903-1916	Cottonwood 1909-1916	Eureka 1909-1916
Early— Sixty-day	54.8	39.1	11.4	35.9
Late— Swedish Select	44.1	35.4	6.7	31.8

Oat Cir., Agronomy Department,  
S. D. State College

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## MARKET GRADE REQUIREMENTS FOR OATS

Grade	Condition and general appearance. <sup>1</sup>	Minimum test weight per bushel (Pounds)	Sound cultivated oats not less than— (Per Cent)	Heat damaged (oats or other grains) (Per Cent)	Foreign material (Per Cent)	Wild oats (Per Cent)	Other colors, cultivated and wild oats (Per Cent)
1	Shall be cool and sweet, and of good color .....	32	98	0.1	2	2	32
2	Shall be cool and sweet, and may be slightly stained .....	29	95	.3	2	3	45
3	Shall be cool and sweet, and may be stained or slightly weathered ..	26	90	1	3	5	10
4	Shall be cool, and may be musty weathered, or badly stained .....	23	80	6	5	10	10

Sample Grade—Shall be white, red, gray, black, mixed, bleached, or clipped oats, respectively, which do not come within the requirements of any of the grades from No. 1 to No. 4, inclusive.

<sup>1</sup>The percentage of moisture in grades Nos. 1, 2, and 3 shall not exceed 14½, and in grade No. 4 shall not exceed 16.

All determinations shall be upon the basis of the lot of grain as a whole, including foreign material, other grains and wild oats.

# COMPARATIVE YIELDS OF LEADING VARIETIES OF BARLEY

Varieties	Yields in Bushels per Acre				
	Brookings 1913-17	Higmore 1910-17	Cottonwood 1916-17	Eureka 1909-17	Belle Fourche Dry Land 1912-16 Irrigated 1914
Six row—Manchuria S. D. 105 (Minn.) 105	53.8	22.8	10.1	27.	20.5
Odessa, S. D. 182	51.8	28.9	18.7		23.5
Oderbrucker S. D. 178 (Wis) 6	47.1				
Two Row—Hanchen, S. D. 28	31.5	25.2	14.3	33.5	25.7
White Smyrna, S. D. 28	37.8	25.4	15.0		28
Special (Black 6 row) Gatami S.D. 122	47.7	26.6	12.7	23.6	22.4
					19.1

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**MARKET GRADES FOR BARLEY**

No. 1—Shall be plump, bright, clean and free from other grains, shall weigh not less than 48 pounds to the measured bushel.

No. 2—Shall be sound and of healthy color, not plump enough for No. 1, reasonably clean and reasonably free from other grains, shall weigh not less than 46 pounds to the measured bushel.

No. 3—Shall include all slightly shrunken and otherwise slightly damaged barley, not good enough for No. 2, shall weigh not less than 44 pounds to the measured bushel.

No. 4—Shall be barley not good enough for No. 3, shall be reasonably sound and reasonably clean, shall weigh not less than 42 pounds to the measured bushel.

No. 5—Shall be reasonably sound and reasonably clean, not good enough for No. 4, shall weigh not less than 40 pounds to the measured bushel.

No. 6—Shall include all barley which for any reason or cause are unfit for the higher grades.

Sample grade shall include all barley in a heating condition, too musty or too damp to be safe for warehousing or that is badly bin burnt or fire burnt, badly damaged, exceedingly dirty, containing live weevils or otherwise unfit for storage.

# COMPARATIVE YIELDS WINTER WHEAT, SPRING WHEAT AND WINTER RYE (Following Corn)

Grains	Yields in Bushels per Acre				
	Brookings Wheat 10 yr. av. Rye 3 yr. av.	Higmore* 7 yr. av.	Cottonwood	Eureka	Newell (Fallow Ground)
Winter wheat .....	19.8	9.0	.2	0	22
Spring Wheat .....	14.8	12.1	1.5	10.1	12.1
Winter Rye .....	41.6	14.1	4.1	7.8	

\*Winter wheat is not dependable; winter rye is the most dependable small grain crop.  
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## MARKET GRADES RYE

No. 1—Shall be sound, plump and well cleaned and weigh not less than 56 pounds to the measured bushel.

No. 2—Shall be sound, reasonably clean, reasonably free from other grains and weigh not less than 54 pounds to the measured bushel.

No. 3—Shall be rye that is slightly damaged or from any cause unfit for No. 2.

Sample Grade shall include all rye in a heating condition, too musty or too damp to be safe for warehousing, or that is badly bin burnt or fire burnt, badly damaged, exceedingly dirty, containing live weevils or otherwise unfit for storage.

Dockage—This includes any foreign material which can readily be removed from the rye by use of appropriate cleaning devices. The quantity of dockage shall be calculated in terms of percentage based on the total weight of the grain including the dockage. The percentage of dockage when so calculated, when equal to 1% or more, shall be stated in terms of whole per cent and when less than 1% shall not be stated. The percentage of dockage, so determined and stated, shall be added to the grade designation.

# FLAX VARIETIES AND THEIR ACRE YIELD IN SOUTH DAKOTA

Varieties	Highmore	Belle Fourche Exp. Farm		Cottonwood 1913-1915	Bureka 1913-1915
		Dry Land 1912-1915	Irrigated 1912-1915		
Russian (N. D. No. 155) .....	7.1	9.2	10.4		
Select Russian (N. D. No. 1215) .....		10.2			
Resistant (N. D. No. 52) .....	9.2		9.0		
Primost (Minn. No. 25) .....	6.2	8.3	10.2	3.9	10.1

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**MARKET GRADE FLAXSEED**

No. 1—Northwestern Flaxseed—Shall be mature, sound dry and sweet, shall be northern grown, and shall weigh not less than 51 pounds to the measured bushel, shall contain not more than 12.5 per cent of damaged seed.

No. 1—Flaxseed—Shall be sound, dry and free from mustiness, shall be northern grown, shall weigh not less than: 49 pounds to the measured bushel, shall contain not more than 20 per cent of damaged seed.

No. 2 Flaxseed—Shall weigh not less than 47 pounds to the measured bushel, may be bin burnt, immature, field damaged or musty, and yet not to a degree to be unfit for storage.

Sample Grade—Shall be flaxseed which does not come within the requirements of the above grades, or that is damp, warm, moldy, fire burnt, very musty or otherwise unfit for storage.

Test weight of flax should be made after it has been cleaned and the amount of foul seed or dockage determined.



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## CLASSIFICATION ALFALFA PLANTS AND VARIETIES

Species	Varieties	Plant Characteristics			
		Growth	Leaves	Flowers	Pods
Medicago sativa	Baltic	Upright	Ovate-oblong and toothed	Born on axis; blue and purple color	Twisted spirally
	Common				
	Non-Irrigated				
	Grimm				
	Turkestan Imported strains				
Medicago falcata	Siberian as Irkutsk	Upright to procumbent. Endures dry cold climates and severe wind sweep	Variations	Yellow and part yellow in color	Sickle shaped
	Semipalatinsk				
	Russian as Kharkov				
	Orenburg				
	Cossack				
Medicago media	Cherno	Hybrids between M. sativa and M. falcata. Endures cold dry climates		Varied in color	
	North Sweden				
	French				

Medicago ruthenica	Gobi-desert	Spreading Endures cold and severe wind sweep	Small, narrow and abundant	Flat and oval containing as a rule not over 4 seeds.
Medicago platycarpa	Siberian No. 73	Hard, smooth and almost trailing stems Endures ex- treme cold	Yellow in color	Flat

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### RELATIVE YIELDS OF HAY OF ALFAIFA VARIETIES

Pounds field cured hay per acre. 1913-15

Variety	Brookings	Highmore	Cottonwood	Eureka	Average
Vale S. D. 22 .....	3180	2213	2365	2502	2565
Grimm S. D. 162 .....	2917	2470	2260	2481	2532
Turkestan S. D. 240 .....	3117	2278	2555	2159	2527

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**SORGHUMS****Classification:**

Sudan grass is best for hay.  
Amber canes are best for coarse fodder.  
Dwarf milo is best for silage.  
Kaoliang is best for grain.

**Method of Seeding:**

Best results obtained where drilled rows 36 to 42 inches apart and cultivated with exception Sudan Grass which yielded more in 6 or 12 inch rows where moisture was plentiful. Sow one inch deep.

## FACTORS FAVORING SUCCESSFUL STORAGE

1. Favorable Temperature: A temperature sufficiently high to protect from frost, and low enough to retard decay; for most vegetables 34 to 38 degrees F. is most favorable. Potatoes can be stored most successfully in a temperature of about 38° F.

2. Good Ventilation: Dead air favors the development of decay and the accumulation of moisture on the roof and walls of the store room, and tends to dripping, which is very objectionable. Ventilation can usually be secured by providing the store-room with a number of vents of good size, which may be opened or closed as the condition within demands.

3. Condition of Crop: Roots or tubers to be placed in storage should be mature, sound and free from bruises. Carrots, beets and potatoes, especially if wet when dug, are sometimes better stored temporarily under a slight covering in the field, rather than put at once into a permanent store-house during warm or moderate fall weather. This gives them a chance to dry and "sweat." They must not, however, be permitted to freeze. Be careful that vegetable tops are not mixed with the tubers or roots, as these will set up decay.

4. Air Circulation: Storing roots or tubers in bins with slatted sides and floor will provide for a free circulation of air about them, and greatly retard decay due to sweating or overheating. Where large quantities must be piled together, place large slatted ventilating shafts up through the piles of vegetables.

5. Size of Bins: Do not make the bins large, nor pile the roots or tubers too deeply. Bins 6 or 8 feet by 10 feet are of a good size for root storage. A depth of 4 or 5 feet, with plenty of head room, will give better results than a greater depth.

6. Racks: Some vegetables, particularly onions and cabbage, will keep much better if stored in open racks. The rack should be constructed with slatted floor and sides so that the air may circulate freely all around the stored product.

7. Good Drainage: The root-house or storage room should be so located that perfect drainage will be provided. Excessive moisture increases the humidity within the storage room.

8. Cleanliness: Bacteria and fungi flourish in dirty, damp places, causing heavy losses that might have been avoided. Remove decayed fruit and vegetables at once.

South Dakota Agri. Ext. Cir. No. 9.

## VARIETY TESTS OF POTATOES

Variety	Acre Yields in Bushels (Six highest yields in each station in black type)			
	Brookings 1914-16	Highmore 1914-16	Cottonwood 1915-16	Eureka 1915-16
Early—				
Acme .....	118.1	103.4	67.8	99.2
Bliss Triumph .....	104.6	88.9		
Early Ohio .....	150.	111.9	51.4	195.5
Early Rose .....	114.2	82.9		
Eureka .....	181.6	141.3	40.2	198.8
Irish Cobbler .....	194.	143.1	46.4	257.
New Queen .....	151.4	134.4	38.5	120.9
Quick Lunch .....	151.5	84.7	35.9	108.4
Six Weeks .....	97.	72.3	55.3	74
Surprise .....	155.4	126.7	40.3	154.
White Harvest .....	148.6	126.1	72.2*	102.
West Ohio .....	193.	87.2	53.9	181.2
Late—				
Astonisher .....	166.			160.
Blue Victor .....	159.5	174.4	55.9	181.7
Bugless .....	227.4	134.6	42.8	243.9
Burbank .....	172.	92.8		127.2
Carmen No. 3 .....	169.5	139.8		98.4
Golden Russet .....	179.	150.8	35.4	176.
Late Rose .....	214.1	49.2	34.2	
Livingstone .....	118.3	97.6		129.9
Pearl .....	161.4	91.	40.2	126.
Raleigh .....	202.			213.3
Rural New Yorker .....	149.	121.9		138.2

\*Not recommended for general culture.

S. Dak. Exp. Station Bul 76,

# **SIZE OF SEED POTATOES PIECES IN RELATION TO YIELD**

Tests were made with Early Ohio and Carmen No. 3.

Size of seed piece	Yield in bushels per acre	Percentage increase over small seed
Small .....	174.7	
Medium (Quarters)	271.7	55.5
Large (Halves) ...	298.5	70.9

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## POTATO GRADES

## U. S. No. 1—

Sound potatoes of similar varietal characteristics, practically free from dirt or other foreign matter, frost injury, sunburn, second growth, **growth cracks**, cuts, scab, blight, soft rot, dry rot, and damage caused by disease, insects, or mechanical or other means.

- b The diameter of potatoes of the round varieties shall be not less than 1 7-8 inches, and of potatoes of the long varieties 1 3-4 inches.

## U. S. No. 2—

Potatoes of similar varietal characteristics, practically free from frost injury and **soft rot**, and free from serious damage caused by sunburn, cuts, scab, blight, dry rot or other disease, insects, or mechanical or other means.

- b The diameter of potatoes in this grade shall not be less than 1 1-2 inches.

In order to allow for variations incident to commercial grading and handling of the above grades, five percent by weight of any lot may be under the prescribed size, and, in addition, six percent by weight of any such lot may be below the remaining requirements of this grade; but not more than one-third of such six percent, that is to say, not more than two percent by weight of the entire lot, may have the flesh injured by soft rot.—(d).

## Explanation of Grade Requirements

a. "Practically free" means that the appearance shall not be injured to an extent apparent upon casual examination of the lot, and that any damage from the causes mentioned can be removed by the ordinary processes of paring without appreciable increase in waste over that which would occur if the potato were perfect. Loss of the outer skin (epidermis) only shall not be considered as an injury to the appearance.

b. "Diameter" means the greatest dimension at right angles to the longitudinal axis.

c. "Free from serious damage" means that any damage from the causes mentioned can be removed by the ordinary processes of paring without increase in waste of more than ten percent by weight over that which would occur if the potato were perfect.

d. "Soft rot" means a soft, mushy condition of the tissues, from whatever cause.

## OBNOXIOUS WEEDS AND THEIR ERADICATION

### Barberry

Perennial. The barberry is the only plant that can be infected with the rust when it is in the black fall and winter condition. In the spring the rust will spread from the barberry to the grains or grasses. The harmful barberberries have spiny edged leaves; red oval berries in clusters, spines usually three in one place, a bright yellow color under the bark and are usually four to six inches high. The Japanese barberry is not susceptible to black stem rust and should not be destroyed.

South Dakota has a barberry law which provides for the destruction of all harmful barberberries. It also provides that the owner shall not be paid for the barberberries or the expense of destroying them. The State Entomologist is the police authority in this law. Thirty days is given for the destruction of the barberberries after which the owner may be charged with the expense of destroying the barberberries and may be fined from \$25 to \$500.

### Canada Thistle—

Perennial. Propagated by seeds and deep root stocks. The persistent starvation of roots, the use of the hoe, cultivated crops and early fall plowing may be effective under varying conditions.

### Cocklebur—

Annual. The common practice of eradication in cultivated fields is that of pulling the weed. Stubble land, infested, should be plowed immediately after harvest. If this cannot be done at once, clip the stubble to prevent the cockleburs from producing seed. If none of the plants are permitted to seed, the pest will eventually die out.

### Morning Glory or Field Bindweed—

Perennial. Pasturing with sheep weakens seed so that eradication is easy. In small areas of infestation deep plowing or turning on the hogs should be practiced. Use smother crop as alfalfa which requires frequent cutting. The seed is most frequently found in grain.

**Quack Grass—**

Perennial. Plow in late June. Replow or disk to keep ground black until late September. Seed 5 pecks winter rye. After removing rye, disk stubble and sow 2 pecks millet or early fall plow for corn the next season. If preferred, sow sweet clover to thicken stand and utilize as pasture for a year or more before trying to eradicate it. Sheep and hogs weaken it.

**Russian Thistle—**

Annual. Thorough cultivation, rotation of crops and neighborhood cooperation.

**Wild Mustard—**

Annual. Use the fanning mill—sow clean seed of small grain. Wild mustard is not troublesome over great areas where suitable crop rotations are practiced, especially employing a well cultivated crop on land at least one year in four. Clean seed and clean cultivation over wide areas will drive it out.

**Wild Oats—**

Annual. Employ the most modern cleaning machinery, and sow clean seed of small grain. A sheet of celluloid carefully adjusted over one of the riddles of certain makes of fanning mills will help hold wild oat kernels flat and clean a greater amount out of the wheat. Employ rotations with a clean cultivated crop such as corn, or potatoes, at least one year in four. Wild oats will be driven out with persistent use of clean seed and well adapted rotations.

## FEATURES OF THE SOUTH DAKOTA WEED LAW

### 1. Destruction of Weeds.

Every person and every corporation shall destroy on all lands which he or it may own or occupy, all weeds, plants, and shrubs of the kind known as Wild Sunflower, Canada Thistle, Cockle Burr, Burdock, Barberry\*, Creeping Jennie and Quitch or Quack Grass in such time of the year as will prevent the seeding and spread of such weeds, plants and shrubs. Quitch grass or Quack grass and other noxious weeds, plants or shrubs which propagate from the roots, shall be destroyed by the cultivation of the soil in a manner to uproot the same, and the roots thereof shall be gathered and burned.

### 2. Annual Notice of Weed Eradication—

In April each year the County Auditor shall publish notice in the official newspapers of the county that the weed law will be strictly enforced.

### 3. Enforcement of Weed Law—

It shall be the duty of the township board of supervisors or in case of unorganized townships the duty of the county commissioners to see that the requirements are complied with. If the foregoing provisions are not complied with, a ten days written notice must be given the owner or occupant to the effect that if he does not destroy the weeds within time designated, such weeds will be destroyed by such board at expense of owner of land. In case of unoccupied land, notice may be given by posting in three public places upon the land.

### 4. Hiring the Destruction of the Weeds—

Provision is made for the township boards or county commissioners hiring persons to destroy the noxious weeds at such wages as may be agreed upon and the payment for same made from the general fund of the township or county.

### 5. Paying for the Destruction of Weeds—

The township board or the county commissioners, as the case may be, must keep accurate records of moneys expended, description of land involved, and file same with register of deeds. The owner or lessee shall be liable for all expenses incurred, as expense becomes a lien on the property.

\*The common barberry was further legislated against in 1919. It is unlawful to permit its existence on any premises or to sell or offer the same for sale.

THE HISTORY OF THE  
CITY OF BOSTON  
FROM THE FIRST SETTLEMENT  
TO THE PRESENT TIME  
IN TWO VOLUMES  
BY NATHANIEL BENTLEY  
OF THE BOSTON BAR  
VOL. II  
PUBLISHED BY J. B. BENTLEY  
1822

## **7. ENTOMOLOGY**

Suggestions concerning spray  
material

### **7.1 Insects**

#### **7.11 Field Crops**

Most common insects and control  
methods

#### **7.12 Orchard and Garden Crops**

Most common insects and control  
methods

### **7.2 Bees**

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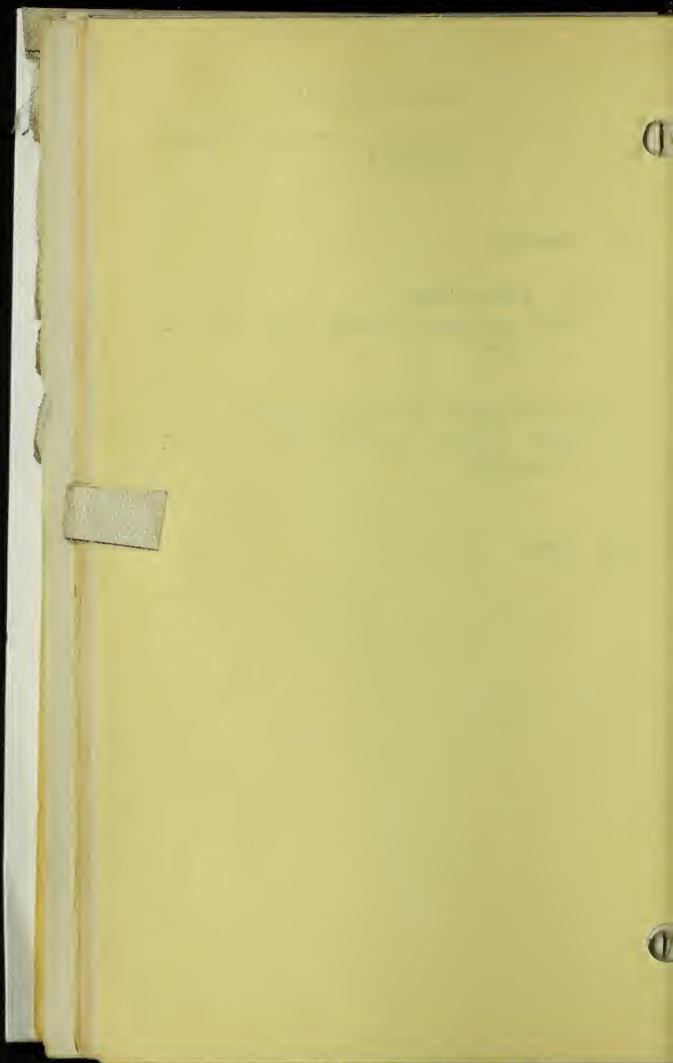
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## SUGGESTIONS CONCERNING SPRAY MATERIALS

1. It is advisable to use commercially prepared spray materials.
2. Spraying is a form of crop insurance and not a "cure all."

### 3. Arsenate of Lead—

Before mixing arsenate of lead into a spray solution it should first be diluted with water to about the consistency of cream. For insect poisoning it should be used at the rate of 2 pounds to 50 gallons water or spray solution. 1 teaspoonful to 1 gallon water. It is less liable than Paris green to harm the foliage.

### 4. Paris Green—

May be applied dry or sprayed as liquid. If used dry, make dust mixture by adding one pound of the poison to 20 lbs common flour or slacked lime and apply when plants are damp from dew or rain. When using the poison as a spray use 1 lb. to 100 gallons of water.  $\frac{1}{2}$  teaspoonful to one gallon of water. Never combine Paris green with lime sulphur.

### 5. Hellebore—

A powder which kills both as a poison and by contact with insects. Especially useful in combating worms while fruit is ripening. Use only strictly fresh powder and dust on after having mixed it with three or four times its weight of flour.

### 6. Kerosene Emulsion—(for scale and all sucking insects)

Kerosene .....	2 gallons
Rain water .....	1 gallon
Soap .....	$\frac{1}{2}$ pound

Dissolve the soap in water by boiling; take from the fire and while hot turn it into the kerosene and churn briskly for 5 minutes. Before using dilute with 6 to 9 parts of water.

### 7. Bordeaux Mixture—

The general formula of 4-4-50 means 4 pounds copper sulphate, 4 lbs. stone lime and 50 gals. water. For treating potatoes for blight it should be 5-5-50. Bordeaux should be made fresh for each spray. Dissolve the copper sulphate in hot water and dilute the solution to 25 gallons. (Don't use iron or tin vessels as it corrodes the metal). Slack the lime and add enough water to it to make 25 gallons. Then pour the two diluted solutions through a strainer simultaneously. Do not mix the two ingredients together in concentrated form or more than will be used at the time. For a gallon of spray solution use  $1\frac{1}{2}$  ounces each of copper sulphate and stone lime and 1 gallon water and prepare as suggested.

## FIELD CROP INSECTS AND THEIR CONTROL

(Most Common)

### Army Worms—

- a. Crop Attacked: Cereals, meadows, garden truck.
- b. Character of Injury: Prefers to feed in grass or small grain growing in low moist part of field. If worms are abundant, they migrate. Feeding and migration usually takes place at night. Most serious injury in July and August.
- c. Methods of Control:
  1. Watch rank growing grass or grain in rather low areas for outbreaks of army worms and spray or burn such areas before worms leave.
  2. When worms are migrating use:
    - (a) Poisoned bait.
    - (b) Trenches
    - (c) Spray
    - (d) Irrigation ditches

### Blister Beetles—

- a. Crop Attacked: Alfalfa, potatoes, beans, etc.
- b. Character of Injury: Destruction of foliage.
- c. Methods of Control:
  1. Cut alfalfa when beetles are abundant.
  2. Spray beans and potatoes with lead arsenate.

### Corn Ear Worm—

- a. Crops Attacked: Corn of all kinds.
- b. Character of Injury: Usually feed upon kernels or ears of corn. Worst injury due to moulds that follow work of ear worm, thereby causing illness and at times death in stock to which such corn is fed.
- c. Methods of Control:
  1. Fall plow.
  2. Dust silk of corn at intervals of 3 to 4 days with lead arsenate powder; this is practical only on show corn, breeding corn and seed corn.

### Corn Root Aphis—

- a. Crop Attacked: Corn.
- b. Character of Injury: Principal damage done to small corn plants. Suck nourishment from roots of plant causing dwarfing of plants with yellowing or reddening of leaves.
- c. Methods of Control:
  1. Rotate so that corn will not grow more than 1 year or at least not more than 2 years in succession on same field.

2. Practice late fall plowing to depth of 6 inches and deep spring disking.
3. Obtain co-operation amongst neighbors.

#### Cutworms--

- a. Crops Attacked: Corn, small grain, garden truck, etc.
- b. Character of Injury: Cuts off stems of plants close to surface of ground or trifle beneath it in spring. Feed principally at night and remain concealed in daytime under clods of earth or rubbish or buried in the soil from one-half to two inches near the injury caused the preceding night.
- c. Methods of Control:
  1. Plow land liable to harbor cutworms (such as grass land, timothy, weedy fields) as early as possible. Plowing in August preferred. If early plowing is impossible, then late plow and follow by spring disking.
  2. Use poison bait.
  3. If cutworms are migrating like army worms, use army worm control.
  4. Use poultry, turkeys, etc.
  5. On land liable to harbor cutworms, put in crops not subject to cutworm injury.
  6. Protect garden plants with tin cans or cylinders of paper.

#### Grasshoppers--

- a. Crops Attacked: Alfalfa, corn, small grain, potatoes.
- b. Character of Injury: Destroy entire plant at times especially if insects are present in large numbers.
- c. Methods of Control:
  1. Destroy eggs by plowing, disking and harrowing.
  2. Destroy hoppers with poison bait (very effective).
  3. Destroy hoppers with hopper catchers.
  4. Destroy hoppers with poultry and turkeys.
  5. Destroy hoppers by spraying with lead arsenate.

#### Poison Bait Formula

Bran .....	25 lbs.
White Arsenic, crude.....	1 lb.
Lemons or oranges .....	6
Cheap molasses .....	2 qts.
Water .....	4 gals.
Sufficient for 5 to 10 acres.	
Sow in P. M. Cost 11 to 25	
cents an acre in 1916.	

**Potato Beetle—**

- a. Crops Attacked: Potato.
- b. Character of Injury: Larva feed upon leaves.
- c. Method of Control: Spray with lead arsenate or Paris green and lime, or dust with powdered lead arsenate.

**Wheat Stem Maggot—**

- a. Crops Attacked: Wheat, rye, barley.
- b. Character of Injury: Destruction of stem in small plants, and girding of large plants causing blighting of head.
- c. Methods of Control: No satisfactory remedy as yet.

**Wireworms—**

- a. Crops Attacked: Corn, small grain crops, potatoes, etc.
- b. Character of Injury: Injury is done in early spring, being confined to the seed, the roots or stem underneath surface of soil.
- c. Methods of Control:
  1. If hay land is to be planted to corn (and this is not good practice from an entomological standpoint), plow after hay is cut and disk several times during remainder of summer.
  2. Land in corn attacked by wireworms should be deeply cultivated even at expense of cutting surface roots.
  3. If wireworms are in wheat field that is to be put into corn next year, plow as soon as wheat is harvested and disk.
  4. Follow sod or hay land by crop not attacked by wireworms.
  5. Poorly drained or heavy soils infested with wireworms should be drained.
  6. Sow more seed than usual.

**White Grubs—**

- a. Crops Attacked: Corn, potatoes, garden crops.
- b. Character of Injury: These are the larvae of May beetles feeding upon roots and underground stems. If abundant, may do serious damage.
- c. Methods of Control:
  1. Fall plow preferably in October or before and harrow. If insect is in beetle stage, fall plow at any time.
  2. Run hogs before October 15, in sod or hay land which is to be broken up and poultry after plowing, if possible.
  3. Rotate crops and do not put corn or potatoes in sod or hay land newly

broken which contains many white grubs.

**Grain Weevil—**

- a. Crops Attacked: Infests stored corn, wheat and barley.
- b. Character of Injury: Greater part of injury caused mostly by the immature stages or "grubs" of the beetle. Their work is concealed within the kernel.

c. Methods of Control:

Fumigation with carbon bisulphide, using 1 pound to each 100 cubic feet or 100 bushels grain. Bins must be tight and every precaution against fire must be observed as the gas is inflammable.

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## MOST COMMON INSECTS OF ORCHARDS AND GARDEN CROPS

Insects	Crops Attacked	Character of Injury	Control
<b>Orchard Aphis</b>	All fruit trees	Cluster on under side of leaf causing curling. Sucking insect.	Spray with nicotine sulphate or kerosene emulsion solution as leaf buds show green and if necessary later before leaves curl.
<b>Caterpillars</b>	Orchards and small fruits	Eating leaves.	Spray with lead arsenate.
<b>Codling Moth</b>	Apples	Larva eats cavities within fruit.	Spray with lead arsenate when petals fall and repeat 3 weeks later.
<b>Curculio</b>	Apple, plum, and grape	Crescent shaped puncture made in fruit when eggs are laid. Larva feeds in fruit.	Spray with lead arsenate when leaf buds open in the spring and follow spray schedule.
<b>Currant Worms</b>	Currants and gooseberries	Defoliates bushes	Spray with lead arsenate. If fruit is coloring, dust bushes with hellebore.
<b>Plum Borer</b>	Plums and cherries	Bores into trunk and branches	Cut out borers with a knife in fall and again in spring.
<b>Plum web-spinning sawfly</b>	Plum	Spinning of web, eating of leaves by larva	Spray with lead arsenate.

Fruit, shade and ornamental trees	when abundant on leaves and fruit. Cause weakening and death.	Garden Crops Cabbage Worm	Cabbage and other crucifers	Feeds on heads.	Spray with paris green and soap or dust with paris green and lime or powdered lead arsenate. Spray when moths flutter about the cabbage.
Cucumbers, melons	Eating of foliage.	Cucumber Beetle	Cucumbers, melons	Eating of foliage.	Plant excess seed; cover plants with netting or dust or spray with Bordeaux and lead arsenate every week as long as necessary.
Potatoes, cabbage, radishes, cucumbers, beets, etc.	Eating of foliage.	Flea Beetle	Potatoes, cabbage, radishes, cucumbers, beets, etc.	Eating of foliage.	Spray with Bordeaux mixture.
Garden truck	Weakening of plants by sucking.	Plant Lice	Garden truck	Weakening of plants by sucking.	Spray with nicotine sulphate or kerosene emulsion before leaves curl.
Potato	Eating of foliage by larva.	Potato Beetle	Potato	Eating of foliage by larva.	Spray with lead arsenate or Paris green and lime or dust with powdered lead arsenate. Repeat every two weeks, if necessary.

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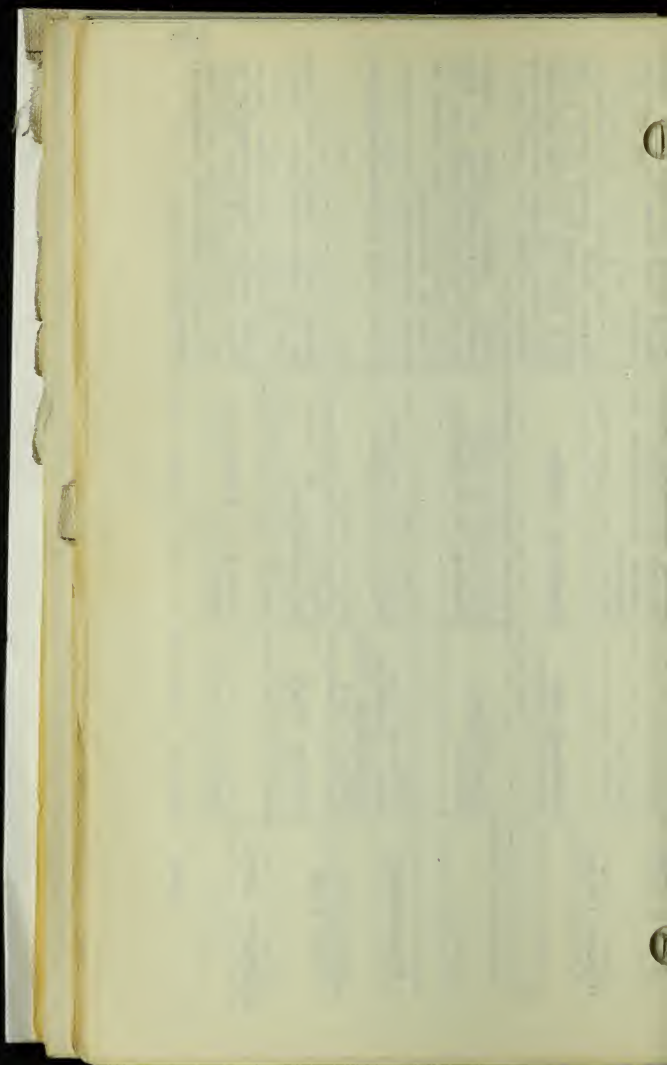
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## 8. PREDATORY ANIMALS

### 8.1 Poison Bait

Formula

### 8.2 Control Measures

Ground squirrels

Prairie dogs

Pocket gophers

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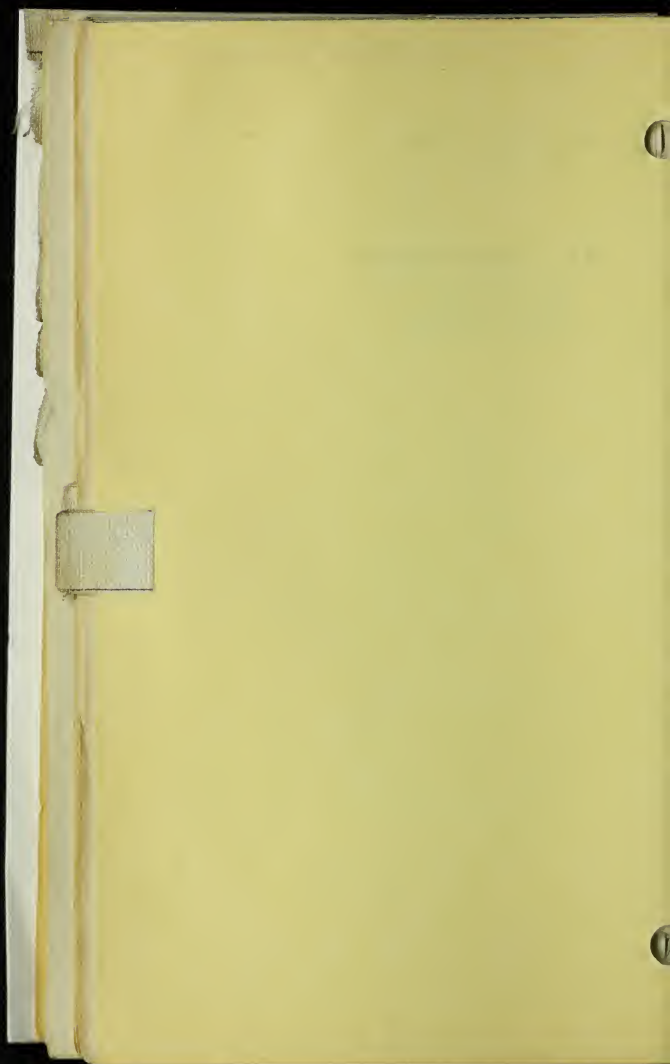
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**FORMULA FOR PREPARING POISON BAIT**

1. Mix thoroughly one ounce of strychnine alkaloid (powdered) and one ounce of baking soda (one heaping tablespoonful.)
2. Sift this into  $\frac{3}{4}$  pint of thin hot starch paste and stir to a creamy mass. The starch paste is made by dissolving one heaping tablespoonful of dry gloss starch in a little cold water, which is then added to  $\frac{3}{4}$  pint of boiling water. Boil and stir constantly until a clear, thin paste is formed.
3. Add  $\frac{1}{4}$  pint (8 tablespoonfuls) heavy corn syrup and a tablespoonful of glycerine and stir thoroughly.
4. Add  $\frac{1}{8}$  ounce (one teaspoonful) saccharine and stir thoroughly.

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## METHOD OF EXTERMINATING RODENTS

### Ground Squirrels: (Richardson, Franklin, Gray and Striped or Thirteen lined.)

1. Pour the strychnine solution over 20 parts of clean oats and mix thoroughly so that each grain of oats is coated. Prepare it 24 to 48 hours before using. For mixing small quantities an ordinary galvanized wash tub is convenient. For larger quantities a tight, smooth box may be used, and mixing done with a shovel.

2. A teaspoonful of the poisoned oats should be placed near each ground squirrel hole on clean hard ground, letting it scatter slightly as it falls. (Placed in this way it will not endanger stock). Do not put the poisoned grain on the loose dirt of the mound or into the holes. Each quart of the poisoned grain is sufficient to treat about 60 holes.

### Prairie Dogs:

1. Prepare strychnine poison as indicated above for the ground squirrel.

2. Mix the poison as before with 15 quarts of oats.

3. Distribute a tablespoonful of the poisoned oats in clean, hard ground near the holes. A quart of this grain should be sufficient to treat 40 prairie dog holes.

### Pocket Gophers:

1.—Trapping—Where these animals are not too abundant they may be controlled by trapping. The most effective trap on the market is the Macabe Gopher trap.

2. Poisoning—Use sweet potatoes or parsnips, cut about an inch long and half inch square and washed and drained. From a pepper box slowly sift  $\frac{1}{8}$  ounce of powdered strychnine (alkaloid) and  $\frac{1}{10}$  of this quantity of saccharine (ground together in a mortar) over about 4 quarts of the dampened baits, stirring to distribute the poison evenly.

3. The runways, which are usually 4 to 8 inches beneath the surface, can be located by means of a probe made of any strong handle, an inch in diameter and 36 inches long. One end should be bluntly pointed. Into the other end should be fitted a piece of  $\frac{3}{8}$  inch rod, protruding about 12 inches and bluntly pointed. A crowbar may be used in sod. By forcing the probe near gopher workings, or a foot or two back of fresh mounds, the open tunnel can be felt as the probe breaks into it. The blunt end of the instrument is now used to carefully enlarge the hole, a bait or two is dropped into the run and the probe hole closed.

## **9. CROP DISEASES**

Solutions for seed treatment

### **9.1 Field Crops**

Common diseases and control

### **9.2 Orchards and Small Fruits**

Common diseases and control

### **9.3 Garden Crops**

Common diseases and control

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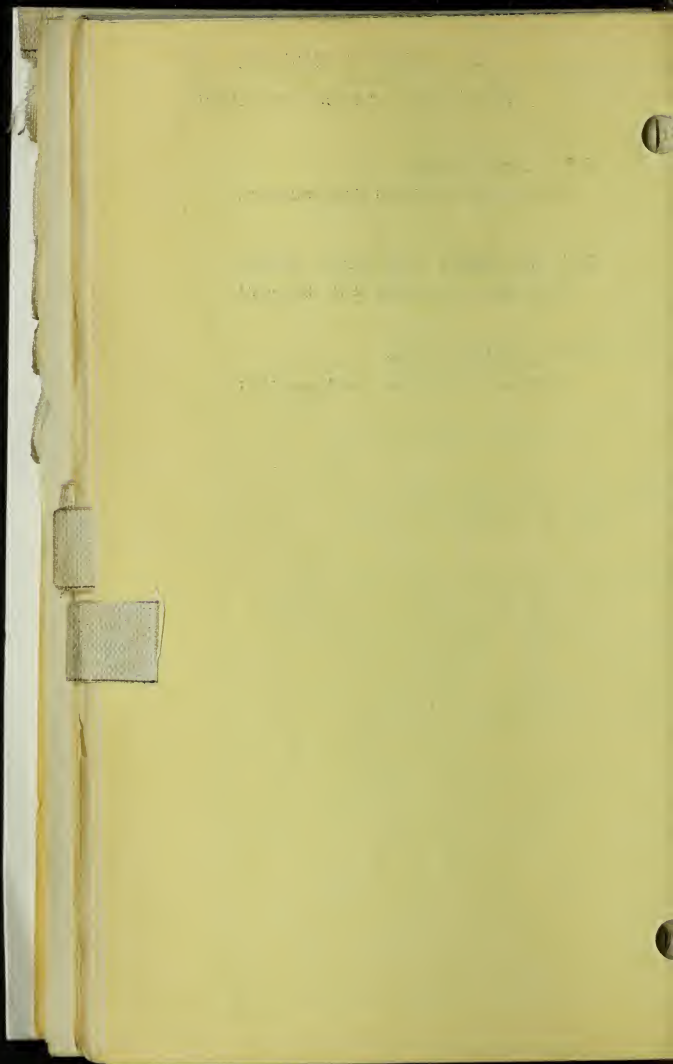
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## SOLUTIONS FOR SEED TREATMENT

### GRAIN:

#### Formaldehyde Treatment—

Consisting of 1 pint formalin (40 per cent formaldehyde) to 40 gallons of water. Soak the seed in this for 10 minutes, stirring thoroughly or sprinkling seed with solution after spreading on a clean floor. Shovel the grain over several times during the sprinkling so all seed is moistened, shovel into a pile, cover with sacks for 2 to 5 hours and spread out to dry or sow at once. 40 gallons solution will treat from 40 to 50 bushels seed.

#### Hot Water Treatment—

Extremely difficult to apply. Soak grain in cold water for 4 hours prior to treatment. Then soak it for 10 minutes in water at 129 degrees Fahrenheit. Spread out to dry. It is not advisable to treat much seed in this way without a great deal of experience, but enough could be treated for a few acres for a seed plot to produce smut free seed. Use gunny sacks for dipping.

All seed grain should be thoroughly cleaned before treating.

### POTATOES:

**Corrosive sublimate:** Dissolve 4 ounces corrosive sublimate in 30 gallons water. Treat seed tubers for 1½ hours. Solution must not be used in metallic vessels. Tubers should be uncut when soaked. Solution can be used 4 times, but addition of 1 ounce corrosive sublimate to 30 gallons solution after each batch is soaked, keeps the treating solution at proper strength.

**Formaldehyde:** Consists of 1 pint formalin (40 per cent formaldehyde) to 30 gallons water. Soak seed tubers for 2 hours and spread out on clean surface to dry. Tubers should be treated whole. This solution may be used 5 times before it becomes ineffective.

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## COMMON FIELD CROP DISEASES

Crop	Diseases	Characteristics	Control or Prevention
Alfalfa	Bacterial Disease	Leaves wilt and turn yellow; stems become coppery brown. Roots rot at center of crown.	Use hardiest varieties. Mow first crop early.
	Leaf Spot	Small round black spots on leaves; usually not serious.	Rotation. Cutting hay crop earlier.
Barley	Leaf Rust—Stem	Orange red spots on leaves; usually not serious. Dark brown spots, rather long and narrow on stems and leaves.	Early seeding. Early seeding and complete destruction of common barley in the community.
	Loose Smut—Covered	Heads blackened and destroyed leaving a bare rachis. Black smut masses form in place of grain covered by grayish membrane. No odor as in covered smut of wheat.	Hot water seed treatment. Formaldehyde seed treatment
	Stripe Disease	Long brown stripes on leaves weak stem and shriveled head.	Soak seed 30 minutes in formaldehyde solution, strength 1 pint to 30 gal. water.

# Beans

Anthrachnose	Brown spots on pods and seedlings.	Seed selection and spraying vines with Bordeaux mixture 5-5-50.
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Blight	Watery brown patches on leaves at first; pods show watery spots and may curl and look scorched.	Seed selection, crop rotation and spraying vines with Bordeaux 5-5-50.
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Rust	Rusty brown or black spots on under side of leaf; plants sometimes turn yellow. Not usually serious.	Destruction of diseased tops and pods.
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Smut	Black smut masses on stalks, ears, tassels or leaves.	No practical method.
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Ear rot	Kernels turn dark brown or grayish, usually but part of ear is affected.	Crop rotation; avoid corn and wheat alternating.
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Emmer	Dark masses form in place of grain.	Formaldehyde seed treatment.
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## COMMON FIELD CROP DISEASES (Continued)

Crop	Disease	Characteristics	Control or Prevention
Flax	Canker	Small cankers form near base of stalk eating through. Stalks break over. Loss often 15 to 30 per cent.	Rotation and good seed. Formaldehyde seed treatment, 1 pint to 30 gals. break strength 30 water applied with fine vapor spray.
	Rust	Rusty brown streaks mostly on stems. Usually not serious.	Early seeding.
	Wilt	Wilting and yellowing of plants at any stage of growth.	Same as for canker.
Millet	Smut	Dark smut masses form in heads.	Formaldehyde seed treatment.
Oats	Leaf Rust	Short orange colored streaks on leaves.	Early seeding and use of early maturing varieties.
	Stem Rust	Rusty brown streaks becoming black as season advances on leaves and stem.	Early seeding and use of early maturing varieties.

Loose Smut Covered	Heads mainly destroyed leaving frame work dusty black.	seed treatment.	seed treatment.
	Smut masses form in place of kernels, chaff dies.	Formaldehyde seed treatment.	Formaldehyde seed treatment.
Spikelet Sterility	Heads turn white and produce no seed.	Treatment unknown.	
Potatoes	Blackleg	Stem blackened and rotted at base when plants are 6 to 8 inches high; some leaves salmon yellow; black rot of tubers.	Seed selection and formaldehyde seed treatment.
	Early Blight	Circular brown, spider web-like spots on leaves; plants die prematurely. Tubers small but sound.	Spray with Bordeaux 5-5-50 when plants are 6 ins. high and repeat every 2 weeks if necessary.
	Late	Irregular brown spots on leaves; slight moldiness on lower parts of stems; dry rot near surfaces of tubers, sometimes developing soft rot.	Spray with Bordeaux 5-5-50 when plants are 6 ins. high and repeat every 2 weeks if necessary.
	Fusarium wilt	Sudden yellowing and wilting of plant and dry rot of tubers.	Crop rotation, seed selection.

## COMMON FIELD CROP DISEASES (Continued)

Crop	Diseases	Characteristics	Control or Prevention
Potatoes (continued)	Rhizoctonia	Small brownish black specks on tubers may form aerial tubers and many small tubers below soil surface.	Corrosive sublimate seed treatment.
	Rot	Dark brown or grayish spots of dry decay on tubers.	Seed selection and rotation.
	Powdery dry	See late blight above.	Seed selection and rotation.
	Late blight	Black rot at stem end.	Seed selection and rotation.
	Stem end black		
	Scab	Scab spots on surface of tuber or on surface of injuries.	Seed treatment with formaldehyde or corrosive sublimate.
	Tipburn	Brownish appearance on leaf tips.	Spray with arsenate of lead.
	Powdery scab	Powdery brown mass like puff ball forms in tuber.	Quarantine, destruction of diseased plants and long rotation.
	Wart disease	Ugly warts form on tubers. Not found in S. D. to date. Be on guard against it.	Quarantine, destruction of diseased plants and long rotation.



# Rye

Ergot	Gray masses, several times size of rye grain forms on heads.	Seed selection, crop rotation, use of dry seed at least one year old. Salt brine method of seed treatment may be used with caution.
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Rust	Rusty brown streaks on stems or leaves, similar to wheat stem rust. Seldom serious.	No treatment.
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Smut	Stems distorted somewhat enlarged with black powdery injuries.	Formaldehyde seed treatment. Crop rotation.
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## Sorghum

Blight	Reddish spots on stems and leaves.	No treatment.
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Head Smut	Dark smut masses form in head. Not reported in S. D. to date.	No treatment.
Kernel	Smut mass forms in place of kernels and are easily broken up.	Formaldehyde seed treatment.

## Wheat

Black end	End of kernel blackened.	Rotation and hand selected seed for seed plot.
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# COMMON FIELD CROP DISEASES (Continued)

Crop	Diseases	Characteristics	Control or Prevention
Wheat (continued)	Ergot	Grayish masses form instead of grain.	Same as for ergot in rye.
	Leaf Rust	Orange red spots, short and rectangular on leaves only.	Early seed'ng and use of early and resistant varieties
	Stem Rust	Rusty brown streaks on leaves and stems turning black as season advances.	Same as (Acme) wheat. Same prevention as for leaf rust and destroy all common-barberry bushes in community.
	Stripe	Long yellow stripes or long spots on leaves. Reported but once in S. D. to date.	Quarantine.
	Loose Smut	Head destroyed except central rachis which remains dusty with black smut.	Hot water seed treatment.
	Stinking	Smut masses form in place of grain; chaff remains green but heads appear twisted. Decided odor.	Formaldehyde seed treatment.
	Scab	Mouldy, pinkish gray mass forming, about chaff, attacks kernels, shrivels the slightly affected and destroys those severely affected.	Use of thoroughly graded seed and crop rotation. Avoid corn and wheat alternating.

# MOST COMMON DISEASES ORCHARD AND SMALL FRUITS

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Crop	Disease	Character of Injury	Prevention or Control
All fruit trees	Crown gall	Large wart or tumor like growths at junction of root and stem on nursery stock. Weakens tree.	Destroy all affected trees.
Apple	Blight	Wilting, browning of leaves which do not fall.	Prune out all affected portions at once and burn.
	Black rot	Cankers on limbs and black rot of fruit.	Cut out cankers and spray with fungicide.
	Blotch	Cankers on limbs and black rot of fruit.	Cut out cankers and spray with fungicide.
	Rust	Rust on leaves and fruit.	Destroy all cedar trees in vicinity.
	Scab	Brown spots on leaves and scab on fruit.	See spray schedule.

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# **MOST COMMON DISEASES ORCHARD AND SMALL FRUITS (Continued)**

Crop	Disease	Character of Injury	Prevention or Control
Plum	Black knot	Black knots on limbs.	Cut out and burn.
	Brown rot	Soft rot of fruit.	See spray schedule.
	Leaf spot	Brown spots on leaves.	See spray schedule.
	Plum pocket	Fruit becomes enlarged hal- low and deformed soon after blossoming period.	Severe pruning of diseased twigs and spraying with lime sulphur as blossoms show pink.
Cherry	Black knot Brown rot Leaf spot	Same as plum.	Same as plum.
Currant and Gooseberry	Anthraxnose	Spot disease attacking leaves, young canes and petioles of leaves.	See spray calendar.
	Powdery Mildew	Leaves and fruit affected with grayish to brownish velvety growth.	See spray calendar.

Raspberry	Anthracnose	Spots on canes.	Cut affected canes clear down to root. See spray calendar.
	Cane blight	Wilting of young canes.	Cut out and burn all affected canes.
	Leaf spot	Brownish spots on leaves.	See spray calendar.
Strawberry	Leaf spot	Brown spots on leaves with affected area falling out.	Spray with Bordeaux as soon as growth starts, then new growth after crop is harvested and repeat 3 weeks later.
	Powdery Mildew	Same as gooseberry.	See spray calendar.

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## MOST COMMON DISEASES OF GARDEN CROPS

Crop	Disease	Character of Injury	Prevention or Control
Bean		(See field crop diseases)	
Beet	Leaf spot	Brownish spots on leaves	Spray with Bordeaux mixture.
Cabbage and Califlower	Black rot	Black soft rot of roots	Destruction of diseased plants and rotation of garden crops.
	Club root*	Wilting of plants during day and malformations on roots.	Destruction of diseased plants and rotation of garden crops.
Celery	Blight	Irregular brown spots on leaves and stems. Also affects carrots.	Spray with Bordeaux mixture when plants are small.
	Rust	Reddish rust on leaves and stem.	Spray as for blight.

# Raspberry

Anthracnose	Spots on canes.	Cut affected canes clear down to root. See spray calendar.
Cane blight	Wilting of young canes.	Cut out and burn all affected canes.
Leaf spot	Brownish spots on leaves.	See spray calendar.
Leaf spot	Brown spots on leaves with affected area falling out.	Spray with Bordeaux as soon as growth starts, then new growth after crop is harvested and repeat 3 weeks later.
Powdery Mildew	Same as gooseberry.	See spray calendar.

# Strawberry

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### MOST COMMON DISEASES OF GARDEN CROPS

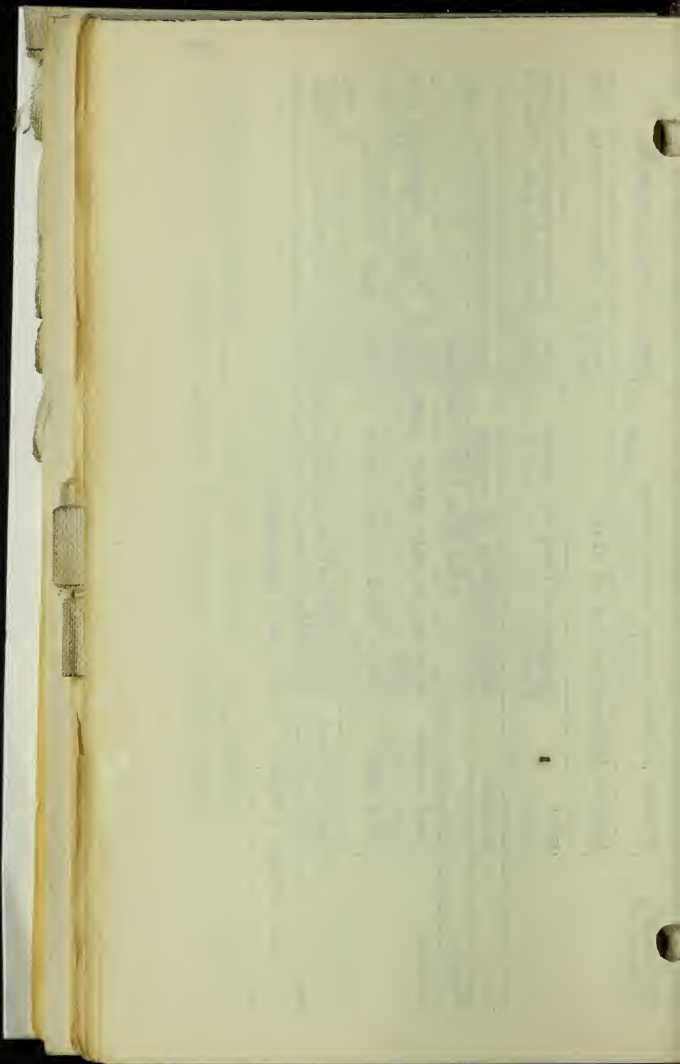
Crop	Disease	Character of Injury	Prevention or Control
Bean		(See field crop diseases)	
Beet	Leaf spot	Brownish spots on leaves	Spray with Bordeaux mixture.
Cabbage and Califlower	Black rot	Black soft rot of roots	Destruction of diseased plants and rotation of garden crops.
	Club root*	Wilting of plants during day and malformations on roots.	Destruction of diseased plants and rotation of garden crops.
Celery	Blight	Irregular brown spots on leaves and stems. Also affects carrots.	Spray with Bordeaux mixture when plants are small.
	Rust	Reddish rust on leaves and stem.	Spray as for blight.



Cucumbers, Melons, etc.	Downy mildew	leaves, leaves dying.	Angular brown spots on	Spray with Bordeaux.
	Mosaic disease	Stunting of fruit.		Destroy affected plants. Use good seed.
	Wilt	Sudden wilting of plants.		Keep plants vigorous. Spray with Bordeaux and arsenate of lead.
Pea	Mildew	White coating on leaves.		Spray with Bordeaux.
Potato		(See field crop diseases)		
Tomato	Leaf blight	Similar to late blight toes.	Spray with Bordeaux at time of setting of plant.	
	Leaf spot	Small dark brown spots on leaves.	Spray with Bordeaux.	
	Blossom end rot	Brownish rot on blossom end of fruit.	Proper cultural conditions.	

\*Also affects radishes, turnips and rutabages.

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## 10. HORTICULTURE

Planting table for orchard and  
small fruits

### 10.1 Orchard Fruits

Recommended varieties for South Da-  
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Spray calendar

Pruning of fruit trees

### 10.2 Small Fruits

Recommended varieties for South Da-  
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Spray calendar

Pruning of small fruits

### 10.3 Gardening

Suggested varieties of garden crops for  
South Dakota

Planting table

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# DISTANCES APART FOR PLANTING FRUIT TREES OR BUSHES

Kind of Fruit	Time required to bear	Longevity under high culture
Apples	30'x40'	3 yrs. Good crop in 10 yrs.   25-40 years
Crabs	10'x10'	3 yrs. Good crop in 10 yrs.   25-40 years
Plum	16'x20'	3 yrs. Good crop 5 to 6 yrs.   20-25 years
Currant	4'x 5'	1 yr. Good crop in 2 to 3 yrs.   20 years
Gooseberry	4'x 5'	1 yr. Good crop in 2 to 3 yrs.   20 years
Raspberry	3'x 6'	1 yr. Good crop in 2 to 3 yrs.   8-12 years
Strawberry	1'x 3'	1 yr. Heaviest crop gener-   3 years ally in 2 years.

## RECOMMENDED VARIETIES ORCHARD FRUITS FOR SOUTH DAKOTA DISTRICTS

Fruits and Varieties		Districts		
		Northern	Central	Southern   Black Hills
Apples:				
Early Summer—	Fall—			
1. Duchess	4. Anisim			
2. Lowland Rasp- berry	5. Dudley	1-2-3	All	All
3. Yellow Trans- parent	6. Iowa Beauty	4-7-8		
	7. Longfield	9-10		
	8. Okabena			
	9. Patten Greening			
	10. Wealthy			
Winter—	Late—			
Early—	11. Northwestern	11-17- 18-	11-12- 13-17- 18-19- 20-21	All
11. Hibernal	Greening			
12. Iowa Blush	18. Malinda			
13. Milwaukee	19. McIntosh Red			
14. Salome	20. Plum Cider			
15. Sheriff	21. Wolf River			
16. Scott Winter				
Cherries:				
1. Early Richmond	4. Homer	None	None	All
2. English Morello	5. Wragg			
3. Large Montmor- ency				1-3-5

# All the Following Varieties Adapted to Each District.

## Crab Apples:

### Early—

22. Boner Sweet
23. Early Strawberry
24. Florence
25. Martha
26. Sweet Russett
27. Whitney

### Late—

28. Hyslop
29. Late Red Siberian
30. Late Yellow Siberian
31. Lowland
32. Mercer
33. Trancendent

## Plums:

1. Cheney
2. DeSota
3. Forest Garden
4. Hawkeye
5. Surprise

6. Terry
7. Wastesa
8. Weaver
9. Wolf
10. Wyant

## Hybrid Plums:

- Sandcherry and Japanese Plum Hybrids—
1. Cheresota
  2. Opata
  3. Sanistoa
  4. Sapa
  5. Waitampa
  6. Native Plum and Chinese Apricot Hybrids
  7. Hanska
  8. Tokata
  9. Native Plum and Japanese Plum Hybrids—
  10. Waneta
  11. Native Plum and Sandcherry Hybrids—
  12. Compass



## SPRAY CALENDAR

	1st Spray	2nd Spray	3rd Spray	4th Spray
APPLES	Just as the leaf buds break, showing pink.	As soon as the petals have fallen.	Two or three weeks later.	Middle to late July.
Chief enemies controlled	Scale, scab, aphid, bud moth.	Scab, aphid, canker worm. The best preventive against wormy apples.	Codling moth, scab, tent caterpillar, aphid.	Scab, codling moth (second brood) bitter rot, blotch.
Formula 1 Gal. mixture	1 pint lime sulphur. 1 teaspoon Black Leaf 40. 1 teaspoon arsenate of lead. 1 gal. water.	1 1/5 pint lime sulphur. 1 teaspoon Black Leaf 40. 1 teaspoon arsenate of lead. 1 gal. water.	Same as for 2nd spray.	Bordeaux (4-4-50) 1 teaspoon arsenate of lead.
Formula 50 Gal. mixture	5 gal. lime sulphur. 3/8 pint Black Leaf 40. 2 1/2 lbs. arsenate of lead. 45 gals. water.	1 1/4 gal. lime sulphur. 3/8 pint Black Leaf 40. 2 1/2 lbs. arsenate of lead. 50 gals. water.	Same as for 2nd spray.	Bordeaux (4-4-50). 2 1/2 lbs. arsenate of lead.

PLUMS and CHERRIES	1st Spray A few weeks be- fore time of blooming.	2nd Spray Just before blossom buds open.	3rd Spray Just after blossom petals fall.	4th Spray About 10 days later after fruit has set.
Chief pests controlled.	Scale, aphids, curculio, plum pocket.	Brown rot, plum pocket.	Brown rot, curculio, aphids.	Brown rot, aphids.
Formula 1 gal. mixture	1 pint lime sul- phur. 1 teaspoon arsenate of lead. 1 gal. water.	1/5 pint lime sulphur. 1 tea- spoon arsenate of lead. 1 gal. water.	Bordeaux (4-4-50) 1 teaspoon ar- senate of lead. 1 teaspoon Black Leaf 40.	Bordeaux (4-4-50) 1 1/2 teaspoon Black Leaf 40.
Formula. 50 gal. mixture.	5 gal. lime sul- phur. 2 1/2 lbs. arsenate of lead. 45 gals. water	1 1/4 gal. lime sulphur. 2 1/2 lbs. arsenate of lead. 50 gals. water.	Bordeaux (4-4-50) 2 1/2 lbs. arsenate of lead. 3/4 pint Black Leaf 40.	Bordeaux (4-4-50) and 3/4 pint Black Leaf 40.

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## PRUNING OF FRUIT TREES

### WHEN—

1. Late winter or early spring—if the object is to develop growth of twigs, fruit spurs or branches.
2. Midsummer—if the object is to develop fruit buds.
3. Fall or early winter—if the object is to develop growth in diameter of the trunk or limbs.
4. Any time—if the object is to remove interfering branches, dead or diseased branches or branches marring beauty of tree.

### HOW—

1. Head low—to produce a stronger tree with trunk better protected from sun scald; tree more easily pruned and sprayed and fruit more easily gathered.
2. Annually remove such branches as growth may indicate to keep the tree balanced and conforming to desired shape.

# RECOMMENDED VARIETIES SMALL FRUITS FOR SOUTH DAKOTA DISTRICTS

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Fruits and Varieties	Districts		
	Northern	Central	Southern   Black Hills
<b>Currents:</b> <b>Red—</b> 1. London Market 2. Long Burth Holland 3. Pamona <b>White—</b> 4. Perfection 5. Red Dutch 6. Victoria 7. White Grape	All Varieties adapted Each District		
<b>Grapes:</b> 1. Beta 2. Concord	1	1	All
<b>Gooseberries:</b> 1. Carrie 2. Houghton	3. Niagara 4. Worden	3. Pearl	All Varieties adapted Each District
<b>Raspberries: (Red varieties)</b> 1. King 2. London 3. Ohta	4. Sunbeam 5. Turner	3-4	1-3-4
<b>Strawberries:</b> <b>Early—</b> 1. Senator Dunlop	3-4	3-4	1-2
<b>Everbearing—</b> 2. Progressive	Both Varieties adapted Each District		

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## SPRAY CALENDAR—SMALL FRUITS

CURRENTS AND GOOSE- BERRIES	1st Spray As leaves open.	2nd Spray 2 weeks later or sooner if worms appear.	3rd Spray 2 weeks later if necessary.	4th Spray 2 weeks later if necessary.
Chief enemies controlled	Mildew	Mildew Worms	Anthracnose Mildew Leaf Spot Worms	Same as for 3rd
Formula 1 gal. mixture	Bordeaux 4-4-50	Same solution as for 1st spray adding 1 tea- spoon arsenate of lead.	Same as 2nd spray.	Same as 2nd spray. If danger of staining fruit, use liver of sul- phur instead of Bordeaux.
RASPBERRY	1st Spray Before leaves open.	2nd Spray When leaves grown.	3rd Spray On young canes 6 inches high.	4th Spray Repeat one week later.
Chief enemies controlled	Cane blight Leaf spot.	Cane blight Leaf spot.	Cane Blight Leaf Spot Anthracnose	Leaf eating in- sects. Cane Blight Anthracnose
Formula 1 gal. mixture	Bordeaux (4-4-50)	Repeat.	1 gal. Bordeaux (4-4-50). 1 tea- spoon arsenate of lead.	Repeat as for No. 3.

### PRUNING OF SMALL FRUITS

**Currant and Gooseberry**—All canes over three years old should be cut out early each spring.

**Raspberry**—All canes one year old should be cut out early each spring.

**Sandcherry Hybrids**—These should be renewed like the gooseberry, saving the new sprouts for bearing fruit.

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# SUGGESTED VARIETIES OF GARDEN CROPS

Crop—	Varieties
Asparagus—	
Palmetto	
Beans—	
Bush, wax or yellow podded:	Brittle Wax, Pencil-Pod Black, Kidney Wax.
Green Podded:	Stringless Green Pod, Fordhook Favorite.
Shell:	Dwarf Horticultural, Marrowfat (soup), Goddard.
Pole, green podded:	Kentucky Wonder, Burger.
Wax podded:	Golden Cluster.
Bush Lima:	Fordhook Bush, Henderson's Bush.
Pole Lima:	Early Leviathan, King of Garden.
Beets—	
Early:	Early Model, Crosby's Egyptian.
Second early or main crop:	Detroit Dark Red, Improved Blood Turnip.
Cabbage—	
Early:	Jersey Wakefield, Copenhagen Market.
Midsummer:	Danish Roundhead.
Late:	Danish Ballhead (for winter storing)
Carrots—	
French Forcing (early),	Chantenay, Dan- vers' Half Long.
Cauliflower—	
Snowball	
Celery—	
Summer and fall:	Golden Self-Blanching, Easy Blanching.
Winter Storing:	Winter Queen, Giant Paseal.
Corn (sweet)—	
Extra early:	Peep O'Day
Second early:	Golden Bantam
Late:	Country Gentleman Stowell's Evergreen
Cucumbers—	
White Spine and Long Green	
Eggplant—	
Black Beauty	
Kohl Rabi—	
White Vienna	
Lettuce—	
Head:	May King, Big Boston, Loose Leaf, Grand Rapids, Prize Head.



Muskmelon—

Emerald Gem, Fordhook.

Onion—

Yellow: Yellow Glove, Yellow Globe Danvers.

Red: Red Weathersfield, Southport Red.

White: White Portugal, Southport White.

Parsnip—

Hollow Crown, Offenham Market.

Peas—

Extra early and smooth: Best Extra Early, Surprise, Little Gem.

Early and wrinkled: Thomas Laxton, Little Marvel.

Main-crop: Stratagem, British Wonder.

Pepper—

Ruby King, Neapolitan Early, Chinese Grant.

Potatoes—

Early: Irish Cobbler, Early Ohio.

Late: Carmen No. 3, Burbank, Raleigh, Guernsey's Bugless.

Pumpkin—

Table Use: Small Pie.

Field Use: Mammoth.

Radishes—

Glove, extra early: Scarlet Globe, Scarlet Turnip, White Tip.

Second early: Crimson Giant.

Long, early: White Icicle, Long Cardinal, Strasburg, Chartier, Lady Finger.

Rhubarb—

Linneaus.

Rutabagas—

Hansen's Siberian, White Fleshed Neckless.

Spinach—

Bloomdale Savoy, Thick Leaf.

Summer Squash—

White Bush, Yellow Crookneck.

Winter Squash—

Hubbard, Delicious.

Swiss Chard—

Lucullus, Large Ribbed, White.

Tomatoes—

Early: Bonny Best, Earliana.

Late: Matchless, Stone (season too short)

Turnips—

Extra Early Purple Top, White Milan Petrowski.

Watermelon—

Kleckley Sweet.

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Jan 1st

Feb 1st

Mar 1st

Apr 1st

May 1st

June 1st

July 1st

Aug 1st

Sept 1st

Oct 1st

Nov 1st

Dec 1st

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PLANTING TABLE FOR GARDEN TRUCK

CROP	Seeds or Plants for 100 ft. of row	Distance for Plants to Stand			Depth of planting	Time to Plant	Ready for use after Planting
		Horse Cultiv.	Hand Cultiv.	Plants Apart in Rows			
Asparagus	60-80	3-5 ft.	12-24 in.	15-20 in.	3-5 in.	Early spring	1-3 yrs.
Beans (bush)	1 pint	30-26 in.	18-24 in.	5 or 8 to ft.	½-2 in.	Succession at 2 weeks intervals	40-65 days
Beans (pole)	½ pint	3-4 ft.	3-4 ft.	3-4 ft.	1-2 in.	Early June	50-80 days.
Beets	2 oz.	24-36 in.	12-18 in.	5 or 6 to ft.	1-2 in.	Early spring and midsummer	60-80 days.
Cabbage	¼ oz.	30-36 in.	24-30 in.	12-18 in.	½ in.	Early spring	90-130 days.
Carrots	1 oz.	30-36 in.	18-24 in.	6 or 7 to ft.	½ in.	Early spring and midsummer	75-110 days
Cauliflower	¼ oz.	30-36 in.	24-30 in.	14-18 in.	½ in.	June (transplant)	100-130 days
Celery	¼ oz.	3-6 ft.	18-36 in.	4-8 in.	½ in.	Transplant late June or early July	120-150 days
Corn (sweet)	¾ pint	36-42 in.	30-36 in.	30-36 in.	1-2 in.	At two weeks intervals until July 1st	60-100 days
Cucumber	½ oz.	4-6 ft.	4-6 ft.	4-6 ft.	1-2 in.	Early summer and Midsummer	60-80 days
Horseradish	70 roots	30-40 in.	24-30 in.	14-20 in.	3-4 in.	Early spring	1-2 yrs.
Kohl-rabi	¼ oz.	30-36 in.	18-24 in.	4-8 in.	½ in.	Early spring and Midsummer	60-80 days.
Lettuce	½ oz.	30 in.	12-18 in.	4-6 in.	½ in.	Early spring and at 2 weeks intervals	60-90 days
Melon, musk	½ oz.	6-8 ft.	6-8 ft.	Hills 6 ft.	1-2 in.	Early summer	120-150 days
Onion (seed)	1 oz.	24-36 in.	12-18 in.	4 or 5 to ft.	½-1 in.	Seed early spring	120-150 days
Parsnip	½ oz.	30-36 in.	18-24 in.	5 or 6 to ft.	½-1 in.	Early spring	125-160 days
Peas	1-2 pints	3-4 ft.	30-36 in.	15 to ft.	2-3 in.	Early spring and at 2 week intervals	40-80 days
Pepper	⅓ oz.	30-36 in.	18-24 in.	15-18 in.	½ in.	Transplant in June	100-140 days
Potato (Irish)	5 lbs. (or 9 bu. per A.)	30-36 in.	24-36 in.	14-18 in.	4 in.	Late spring	80-140 days
Pumpkin	½ oz.	8-12 ft.	8-12 ft.	Hills 8-12 ft.	1-2 in.	May to July	100-140 days
Radish	1 oz.	24-36 in.	12-18 in.	8-12 ft.	½-1 in.	Early spring and at 2 week intervals	20-40 days
Rhubarb (plants)	33 plants	3-5 ft.	3-5 ft.	3 ft.	2-3 in.	Early spring	1-3 yrs.
Rutabagas	¼ oz.	30-26 in.	18-24 in.	6-8 in.	½-1 in.	Early spring and Midsummer	60-80 days
Spinach	1 oz.	30-36 in.	12-18 in.	7 or 8 to ft.	1-2 in.	Early spring and early fall	30-60 days
Squash (bush)	½ oz.	3-4 ft.	3-4 ft.	Hills 3-4 ft.	1-2 in.	Early summer	60-80 days
Squash (late)	½ oz.	7-10 ft.	7-10 ft.	Hills 7-9 ft.	1-2 in.	Early summer	120-160 days
Tomatoes	⅞ oz.	3-5 ft.	3-4 ft.	3 ft.	½-1 in.	Transplant in early summer	100-140 days
Turnip	½ oz.	24-36 in.	18-24 in.	6 to 7 to ft.	¼-½ in.	Early spring and late summer	60-80 days.
Watermelon	1 oz.	8-12 ft.	8-12 ft.	Hills 10 ft.	1-2 in.	May and June	100-120 days

## 11. FORESTRY AND LANDSCAPE GARDENING

Suggestions for beautifying home  
grounds

Trees adapted to South Dakota

Shrubs for home ground planting

Biennials and perennials for  
home ground planting

Annuals for home ground plant-  
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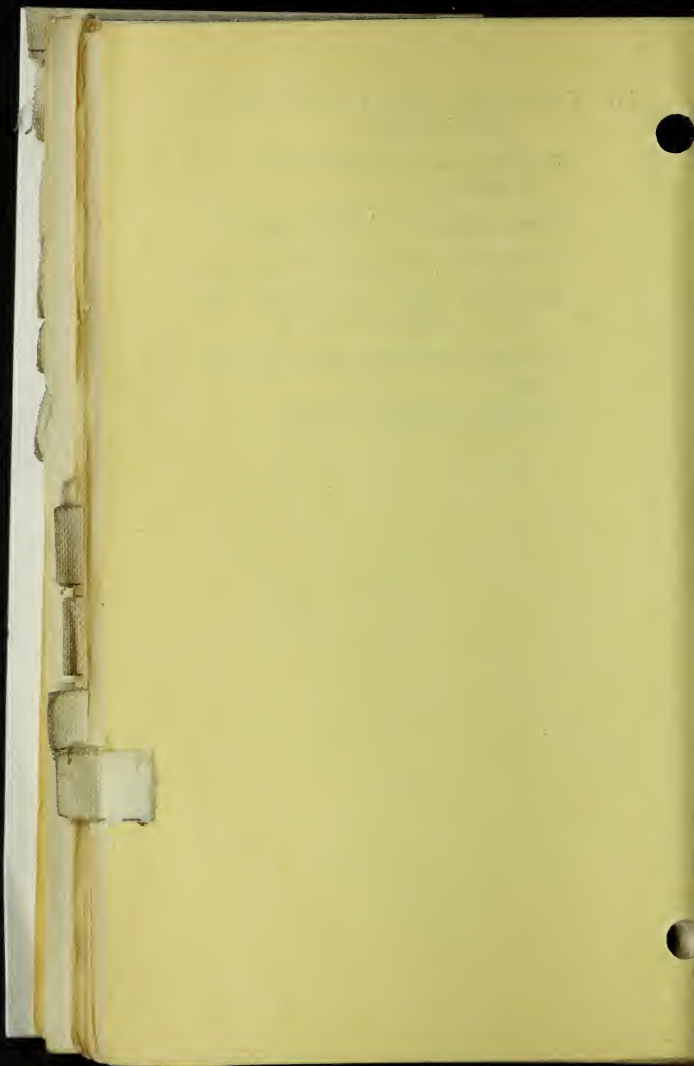
Pruning of hardy shrubs

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## SUGGESTIONS FOR BEAUTIFYING HOME GROUNDS

1. Make a definite planting plan and then plant according to the plan.
2. Avoid straight rows by grouping the planting along the borders, in the corners or about the foundation.
3. Leave a large open lawn.
4. Be liberal in the use of flowering shrubs and perennials. Have a lavish succession of bloom all season.
5. Most ornamentals need winter protection and all ornamentals need the protection of a good shelter belt.
6. Plant evergreens for winter effect, they extend a feeling of warmth.



# TREES ADAPTED TO SOUTH DAKOTA

Classification of Trees	Utility	Districts to which Adapted	
Broad Leaf—			
1. Rapid Growing			
Cottonwood	B	1 to 5	The state districts are divided according to rainfall; they are 1. Southeastern Section Rainfall 25 inches. 2. Eastern Section Rainfall 20 inches to 25 inches. 3. Central Section Rainfall 15 inches to 20 inches. 4. Northwest Section Rainfall 15 inches. 5. Black Hills Section Rainfall 20 inches to 25 inches.
Basswood	A B C	1 to 2	
Mulberry	A B C	1 to 2	
Wild Black Cherry	B B C	1 to 2	
Willows	B B C	1 to 2	
Soft Maples	B B C	1 to 2	
Box Elder	B B C	1 to 2	
Silvered Leaf Poplar	B B C	1 to 2	
Canadian Poplar	A B C	1 to 4	
Northwest Poplar	B B C	1 to 2	
Laurel Leaf Willow	B C	1 to 3	
2. Medium Growing			
White Elm	A B	1 to 5	
White Ash	A B C	2, 2, 5	
Green Ash	A B C	1 to 5	
Honey Locust	A B C	1 to 4	
Hackberry	A B C	1 to 2	
American Mt. Ash	A	1, 2, 5	Numbers indicate the sections where each tree can be grown.
European Mt. Ash	A	1, 2, 5	
White Birch	A	1, 2, 5	
Black Birch	A	1, 2, 5	
Art Leaf Weeping Birch	A	1, 2, 5	

	The Utility Classification			
	is—			
	A. Ornamental Trees			
	B. Woodlot Trees			
	C. Shelterbelt			
3. Slower Growing				
Hard Maple	A	B	C	1 to 2
Walnut	A	B	C	1 to 2
Russian Olive	C	A		1 to 5
Siberian Pea Tree	C	A		1 to 4
Buffalo Berry	C	A		1 to 5
Wild Plum	C			1 to 5
Evergreen—				
1. Medium Growing				
Ponderosa Pine	A	B	C	1 to 5
Austrian Pine	A	B	C	1 to 2
Scotch Pine	A	B	C	1 to 2
Colorado Blue Spruce	A	B	C	1, 2, 5
White Pine	A	B	C	1 to 2
European Larch	A	B	C	1 to 2
White Spruce	A	B	C	1, 2, 5
Norway Spruce	A	B	C	1, 2, 5
Jack Pine	A	B	C	1 to 5
2. Slow Growing				
Silver Fir	A	B	C	1 to 5
Black Hills Spruce	A	B	C	1 to 5
Red Cedar	C			3 to 4

# SHRUBS FOR HOME GROUND PLANTING

11

Common Name and Month of Blooming	Botanical Name	Color of Flower	Character Growth	
			Height Ft.	Habit
April— Japanese Barberry	Berberis Thumbergii	Yellow	2—4	Dense
Thumbergs Spirea	Spirea Thumbergii	White	2—4	Dense
May— Dogwood	Cornus Alba. Sanguinea	White	3—6	Spreading
	Cornus Alba. Elegantissima	White	3—6	Spreading
	Cornus Alba. Siberica	White	6—10	Spreading
Lilac	Syringa Japonica	Purple	5—10	Bushy
	Syringa Josikaea	Purple		Bushy
	Syringa Persica	Purple		Bushy
	Syringa Persica alba	White		Branching
	Syringa Vulgaris	Purple		Spreading
	Syringa Vulgaris alba	White		Spreading
Snowball	Viburnum Opulus Sterilis	White	3—8	Bushy
Yellow Flowering Currant	Ribes Aureum	Yellow	3—6	Bushy
Indian Currant	Symphoricarpos Vulgaris	Yellow		
June— Bridal Wreath	Spirea Van Houtii	White	5—7	Archy

# Honeysuckle

July—	Spirea Anthony Waterer	Grandiflora	Grandiflora	Pink	4—10	Spreading
August—	Snowberry	Hydrangea	Hydrangea	Pink	4—10	Spreading
	Sumach	Spirea Anthony Waterer	Spirea Anthony Waterer	White	4—10	Spreading
		Sambueris Nigra Aurea	Sambueris Nigra Aurea	Red fruit	4—10	Spreading
		Sambueris Nigra laciniata	Sambueris Nigra laciniata	White	5—12	Shrubby
		Sambueris Racemosus	Sambueris Racemosus	White	5—10	Shrubby
		Spirea Anthony Waterer	Spirea Anthony Waterer	White	5—10	Drooping
		Symphoricarpos Racemosus	Symphoricarpos Racemosus	White		
		Hydrangea Paniculata	Hydrangea Paniculata	Crimson	2—3	Spreading
		Grandiflora	Grandiflora	Pink	2—6	Spreading
		Rhuss glabra laciniata	Rhuss glabra laciniata	White	6—12	Spreading
		Rhuss laciniata	Rhuss laciniata	Pink	6—15	Branching
		Rhuss typhina	Rhuss typhina	Crimson	5—10	Branching
		Rhuss typhina laciniata	Rhuss typhina laciniata	Crimson	4—8	Branching
		Spirea Billardii	Spirea Billardii	Crimson	4—10	Branching
		Spirea Anthony Waterer	Spirea Anthony Waterer	Pink	5—10	Bushy
		Enonimous Europeanus	Enonimous Europeanus	Red	2—5	Bushy
				Reddish	2—4	Bushy
September or Later—	Billards Spirea					
	Spirea Anthony Waterer					
	Burning Bush					

## BIENNIALS AND PERENNIALS FOR HOME GROUND PLANTING

	Common Name and Month of Blooming	Color of Flower	Character of Growth	
			Height Ft.	Habit
May—	Garden Pinks	Mixed	1—2	Slender
	Peony	Pink	2—4	Bushy
	Bleeding Heart		2—4	Bushy
June—	Columbines	Variety	1—3	Spreading
	Day Lillies	Orange	2—5	Slender
	Japanese Iris	Variety	1—2	Tall
July—	Gaillardia Grandiflora	Mixed	2—3	Spreading
August—	Hardy Sage	White	1—3	Bushy
	Hollyhocks	Mixed	4—8	
September or later—	Shasta Daisy	White	1—3	Bushy
	Gaillardia Golden Glow	Reddish	1—3	Slender
	Snap Dragon	Mixed	2—4	Slender
	Chrysanthemums	Variety	2—4	Slender
	Delphinium	Blue	2—5	Slender
	Hardy Phlox	Mixed	2—3	Bushy

## ANNUALS FOR HOME GROUND PLANTING SHOWING APPROXIMATE MONTH OF FLOWERING

### June—

Sweet Pea  
Nasturtium  
Pansy

### July—

Chinese and Japanese Pinks  
Marigold

### August—

Asters  
Bachelor Button  
Four O'clock  
Snap Dragon

### September or later—

Cosmos

## BULBS

### May—

Tulip

### August and September—

Gladiolus

## PRUNING OF HARDY SHRUBS

1. Prune according to method of flowering.
  - a. Those which bear flowers on the same season's growth—flowering season generally summer and fall. Examples—rose, hydrangea, mock orange—should be pruned in the dormant season.
2. Those which flower on points of growth that start from the preceding year's growth—flowering season usually in the spring. Example—flowering almond, snowball, spires, lilacs, etc.  
Prune just as soon as the blossoms fade.

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## 12. SILOS AND SILAGE

Silo capacity tables

Daily quantities of silage for  
livestock

Silage values

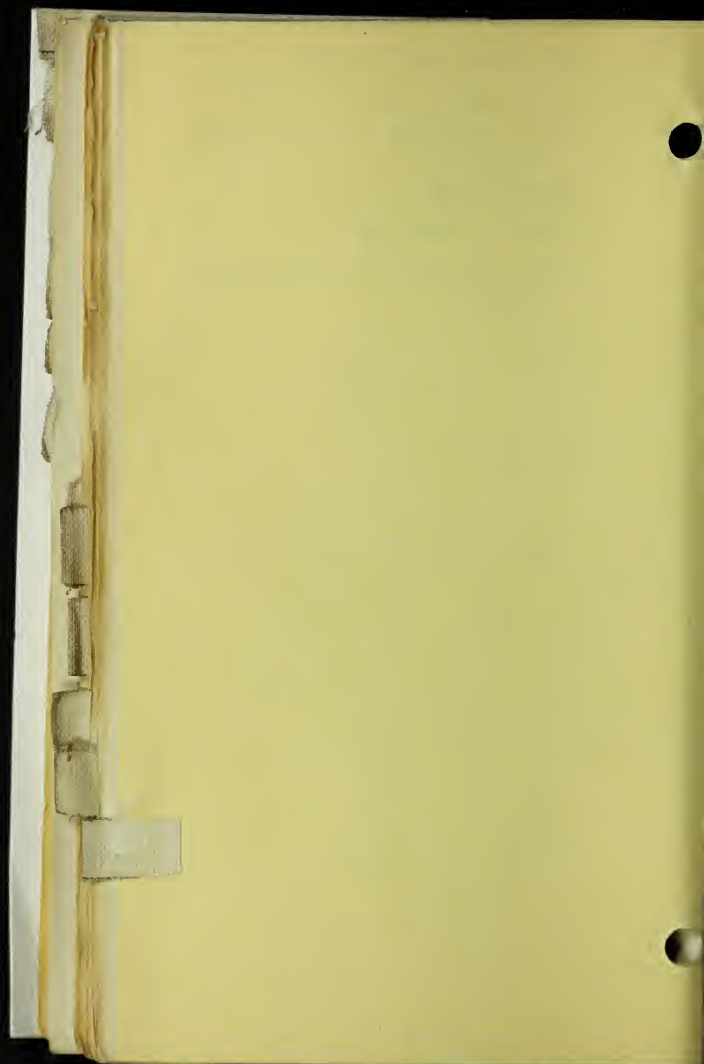
Cost of filling silo

Value of silage cut at different  
stages

Silo

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## CAPACITIES OF SILOS

Depth of silage after settling	Capacity in tons—Inside diameter					
	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.
20	26					
22	30					
24	34	49				
26	38	55				
28	42	61	83			
30	47	67	91			
32		74	100	131		
36		87	119	155	196	
40			138	180	228	281
42				193	245	302
44				207	262	323
46					280	345
48						368

Depth of silo should not be more than 3 times diameter nor less than twice diameter.

The weight per cubic foot increases with the depth, being less than 20 pounds at or near the surface, and 61 pounds at the depth of 35 feet. The mean weight of silage for whole, where depth of silo is—

Depth of Silage in Feet	Mean Weight lbs. per cu. ft.
1	18.7
5	22.1
10	26.1
15	29.8
20	33.3
25	36.5
30	39.6
35	42.8

# FEEDING CAPACITIES OF SILOS

(Winter season)

Inside diameter of silo	Quantity of silage in depth of 2 in. Pounds	Number of animals that may be fed allowing daily				
		40 lbs. head	30 lbs. head	20 lbs. head	10 lbs. head	4 lbs. head
10 ft. ....	524	13	17	26	52	130
12 ft. ....	754	19	25	37	76	190
14 ft. ....	1,026	25	34	51	100	250
16 ft. ....	1,340	33	44	67	132	330
18 ft. ....	1,696	42	56	85	168	420
20 ft. ....	2,094	52	70	104	208	520

# APPROXIMATE QUANTITY OF SILAGE REQUIRED PER DAY (Ill. Sta.)

12

Kind of Stock	Daily Ration—Pounds
Beef Cattle—	
Wintering calves, 8 months old	15 to 25
Wintering breeding cows	30 to 50
Fattening beef cattle 18-22 months old—	
First stage of fattening	20 to 30
Later stage of fattening	12 to 20
Dairy Cattle	30 to 50
Sheep—	
Wintering breeding sheep	3 to 5
Fattening lambs	2 to 3
Fattening sheep	3 to 4

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## \*VALUE OF SILAGE PER TON—Based on the Value of Corn

Price of Corn per Bushel	3 bu. of corn per ton	4 bu. of corn per ton	5 bu. of corn per ton	6 bu. of corn per ton
.80	4.35	4.85	5.40	5.85
.90	4.80	5.40	6.00	6.55
1.00	5.30	5.95	6.60	7.25
1.10	5.80	6.50	7.25	7.95
1.20	6.30	7.10	7.90	8.65
1.30	6.85	7.70	8.55	9.35
1.40	7.40	8.30	9.20	10.10
1.50	7.95	8.90	9.90	10.85
1.60	8.50	9.55	10.60	11.65
1.70	9.10	10.20	11.30	12.45

\*Wallace's Farmer—March 1, 1918.

### COST OF FILLING SILO

40 to 80 rds. haul, 15 hours work, 100 tons,  
12 acres.

1 man to cut corn, \$3.00 per day ....	\$ 4.50
3 horses to cut corn, \$3.00 per day ..	4.50
1 binder to cut corn, \$5.00 per day.	7.50
5 men to haul, \$3.00 per day .....	22.50
5 teams to haul, \$10.00 per day .....	15.00
1 man to help unload, \$3.00 per day.	4.50
1 man to feed silo, \$3.00 per day ...	4.50
1 man in silo, \$3.00 per day .....	4.50
1 silage cutter, \$8.00 per day .....	12.00
1. 15 horse gas engine, \$10.00 per day.	15.00
Cost of twine 50 lbs. at 20c lb. ....	10.00
<hr/>	
Cost of filling silo .....	\$104.50
Cost per acre .....	8.71
Cost per ton .....	1.045

### FEEDING VALUE OF SILAGE CUT AT DIFFERENT STAGES OF GROWTH

Kind of Silage	Pounds Silage per head daily	Average daily gain per head	Average lbs. silage per lb. gain
Frosted corn .....	56.2	2.09	26.9
Glaze or Dent stage	71.7	2.28	31.4
Dough stage .....	73.4	2.27	32.1
Blister or milk stage .....	76.9	1.94	39.8

Average results of 2 feeding periods of  
119 and 90 days in 1916-17 and 1917-18. 5  
steers in a lot, each averaging 840 lbs.

South Dakota Exp. Sta. Bul. 182.



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### **13. LIVESTOCK**

Livestock production statistics

Judging ages of animals

Car load weights and capacities

#### **13.1 Breeding**

Gestation and mating table

Livestock breed associations

South Dakota livestock breeders' associations

Livestock exhibit classifications and terms

Value of purebred sire

Essentials of a bull association

#### **13.2 Feeding**

Average weight of feeding stuffs

Nutrients in feeding stuffs

Cost table per pound

Cost of pasture per cow per day

Precautions in calf feeding

Approximate yearly cost of feeding livestock

#### **13.3 Horses and Mules**

Market classes

Suggested rations

#### **13.4 Beef Cattle**

Range production table

Grain required for fattening steers

Wintering steers

Corn silage vs. roots for steer feeding

Steer feeding experimental results 1914

Suggested rations

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### **13.5 Dairy Cattle**

Highest producing cows each breed  
Advanced registry requirements  
Cow testing association requirements

#### **13.51 Management**

Hand vs. machine milking  
Suggested rations

#### **13.52 Milk, Cream, Butter, Cheese**

Causes of poor tests in testing  
Standardizing milk and cream

### **13.6 Hogs**

Self-feeding vs. hand feeding  
Suggested rations  
Comparative value of hog feeds  
Value of milk in hog feeding  
Value of forage crops for hogs  
Hogging down corn

### **13.7 Sheep**

Value of grains in sheep feeding  
Grain and rape pasture in fattening lambs  
Alfalfa vs. prairie hay in fattening lambs  
Suggested rations  
Market classifications of wool

### **13.8 Poultry**

Principles of housing  
Classes and breeds  
Essentials in selecting breeders  
Practical rations

**LIVESTOCK PRODUCTION STATISTICS**

Livestock	Number of Head Livestock for every 1000 people in U. S.	
	1900	1919
Cattle .....	600	350
Hogs .....	800	600
Sheep .....	880	450

Dr. C. W. McCampbell in Breeders' Gazette

## JUDGING AGE OF ANIMALS

## HORSES:

## Teeth—

Temporary teeth, 24; permanent teeth, male 40, female 36-40.

There are three indicators of age, first the eruption of the teeth, second the "cups" or "tables" on the wearing surfaces, and third the form and relative position of the teeth. In the horse the eruption of the incisor teeth is as follows:

Location of Teeth	Temporary or colt teeth come in at	Permanent or horse teeth come in at	Permanent teeth are up in wear at
1st pair middles or nippers..	Birth or 1st two weeks	2½ yrs.	3 yrs.
2nd pair or intermediates (lo- cated on either side of the nippers) .....	4 to 6 weeks of age	3½ yrs.	4 yrs.
3rd pair or corners .....	7 to 8 months	4½ yrs.	5 yrs.

As the teeth wear down the "cups" disappear in quite regular order, hence the following suggestions as to age:

Lower Jaw		Upper Jaw	
Cups Leave at		Cups Leave at	
Middle or nipper pair .....	5½—6 years	Middle pair .....	9½ years
Intermediate or next pair .....	6½—7 years	Intermediate pair .....	10½ years
Corner pair .....	7½—8 years	Corner pair .....	11½ years

**CATTLE:**

## Teeth—

Temporary—20; permanent—32.

Milk teeth (4 pr.) appear within 1st month.

First pair permanent teeth appear at 18 months.

Second pair permanent teeth appear at 27 months.

Third pair permanent teeth appear at 36 months.

Fourth pair permanent teeth appear at 45 months.

## Horns—

After two years growth the horns grow more slowly causing a more or less distinct ring for each years growth thereafter.

**SHEEP:**

## Teeth—

Temporary—20; permanent—32.

First pair permanent teeth appear at 12 months.

Second pair permanent teeth appear at 26 months.

Third pair permanent teeth appear at 37 months.

Fourth pair permanent teeth appear at 48 months.

**Minimum Weights in Carlots of Livestock—Interstate Shipments—established by Interstate Commerce Commission on which all railroads in the Northwest must Protect the Shipper.**

Car Lengths Inside Measurement	Car Length Usually Spoken of as	For Cattle				For Hogs		For Sheep		For Mixed Cars	
		Double Deck		Single Deck		Double Deck		Single Deck		For Sheep	
33 ft. 9 in. or less (1) ..	33 foot	20,500	20,500	16,000	20,500	20,500	20,500	11,000	11,000	(2)	(2)
Over 33ft. 9in. to 36ft. 7in.	36 foot	22,000	22,000	17,000	22,000	22,000	22,000	12,000	12,000	(2)	(2)
Over 36ft. 7in. to 40ft. 6in.	40 foot	24,000	24,000	19,000	24,000	24,000	24,000	14,000	14,000	(2)	(2)
Over 40 ft. 6 in. ....	44 foot	26,000	26,000	21,000	26,000	26,000	26,000	16,000	16,000	(2)	(2)

(1) Will not apply to following: C & N W; C B & Q; R I; N P; C G & W and M & St L.

(2) The rate on mixed carloads of livestock will be the highest rate per 100 lbs. for any kind of stock in the car and subject to the highest carload minimum weight, except that when a full deck of sheep and a full deck of hogs are loaded in a double deck car, the single deck rates on each will apply.



Showing the approximate (per head) capacity of cars of different lengths for cattle, hogs and sheep of different weights.

Car Lengths	Approximate carrying capacity of different length cars, in numbers										
	Cattle weighing from			Hogs weighing (per deck)				Sheep Weighing (per deck)			
	500 to 700 lbs.	800 to 1000 lbs.	1000 to 1200 lbs.	100 lbs.	150 lbs.	200 lbs.	250 lbs.	50 lbs.	85 lbs.	100 lbs.	120 lbs.
31	35 39	24 26	19 21	112 116	82 86	70 72	61 63	142 146	112 116	104 107	91 95
33	38 42	25 27	20 23	119 124	87 91	75 77	67 69	150 155	115 119	107 111	96 100
36	40 45	27 30	22 25	130 135	95 99	82 85	70 72	165 170	130 135	120 125	103 107
40	50 52	31 33	27 28	145 150	106 110	88 92	80 82	184 188	145 149	134 138	117 121
44	51 55	34 36	28 30	160 165	117 121	98 102	86 90	200 208	160 164	148 155	129 134

Caution:—Do not load heavy in hot weather.

GESTATION TABLE

	Average Gestation Period		Date Animal Due to Give Birth		
	Weeks	Days	Mare	Cow	Ewe
Rabbit	.....	30			
Cat	.....	50			
Dog	.....	60			
Sow	.....	112			
Ewe	.....	150			
Cow	.....	283			
Mare	.....	340			
					Extremes (days)
					109 to 120
					146 to 157
					240 to 311
					307 to 412

Date of Service	Mare	Cow	Ewe	Sow
Jan. 1	Dec. 6	Oct. 10	May 30	Apr. 22
Jan. 11	Dec. 16	Oct. 20	June 9	May 12
Jan. 21	Dec. 26	Oct. 30	June 19	May 22
Jan. 31	Jan. 5	Nov. 9	June 29	May 22
Feb. 10	Jan. 15	Nov. 19	July 9	June 1
Feb. 20	Jan. 25	Nov. 29	July 19	June 11
Mar. 2	Feb. 4	Dec. 9	July 29	June 21
Mar. 12	Feb. 14	Dec. 19	Aug. 8	July 1
Mar. 22	Feb. 24	Dec. 29	Aug. 18	July 11
Apr. 1	Mar. 6	Jan. 8	Aug. 28	July 21
Apr. 11	Mar. 16	Jan. 18	Aug. 7	July 31
Apr. 21	Mar. 26	Jan. 28	Sep. 17	Aug. 10
May 1	Apr. 5	Feb. 7	Sep. 27	Aug. 20
May 11	Apr. 15	Feb. 17	Oct. 7	Aug. 30
May 21	Apr. 25	Feb. 27	Oct. 17	Sep. 9
May 31	May 5	Mar. 9	Oct. 27	Sep. 19

June 10	May 15	Mar. 19	Nov. 6	Sep. 29
June 20	May 25	Mar. 29	Nov. 16	Oct. 9
June 30	June 4	Apr. 8	Nov. 26	Oct. 19
July 10	June 14	Apr. 18	Dec. 6	Oct. 29
July 20	June 24	Apr. 28	Dec. 16	Nov. 8
July 30	July 4	May 8	Dec. 26	Nov. 18
Aug. 9	July 14	May 18	Jan. 5	Nov. 28
Aug. 19	July 24	May 28	Jan. 15	Dec. 8
Aug. 29	Aug. 3	June 7	Jan. 25	Dec. 18
Sep. 8	Aug. 13	June 17	Feb. 4	Dec. 28
Sep. 18	Aug. 23	June 27	Feb. 14	Jan. 7
Sep. 28	Sep. 2	July 7	Feb. 24	Jan. 17
Oct. 8	Sep. 12	July 17	Mar. 6	Jan. 27
Oct. 18	Sep. 22	July 27	Mar. 16	Feb. 6
Oct. 28	Oct. 2	Aug. 6	Mar. 26	Feb. 16
Nov. 7	Oct. 12	Aug. 16	Apr. 5	Feb. 26
Nov. 17	Oct. 22	Aug. 26	Apr. 15	Mar. 8
Nov. 27	Nov. 1	Sep. 5	Apr. 25	Mar. 18
Dec. 7	Nov. 11	Sep. 15	May 5	Mar. 28
Dec. 17	Nov. 21	Sep. 25	May 15	Apr. 7
Dec. 27	Dec. 1	Oct. 5	May 25	Apr. 17

# DURATION AND FREQUENCY OF HEAT IN FARM ANIMALS IN REGULAR CONDITION

	In heat for	If not impregnated heat will recur in
Mares	.....5-7 days*	3 to 6 weeks
Cows	.....2-3 days*	3 to 4 weeks
Ewes	.....2-3 days	17 to 28 days
Sows	.....2-4 days	21 days

\*Subject to variation.

## INCUBATION PERIOD OF FOWLS

	Average	Extremes
Goose .....	30 days	27 to 33 days
Turkey .....	29 days	26 to 30 days
Duck .....	29 days	26 to 32 days
Peahen .....	28 days	28 to 30 days
Guinea Hen .....	26 days	25 to 26 days
Hen .....	21 days	20 to 23 days
Pigeon .....	18 days	16 to 20 days

## MATING TABLE

Showing number of females to each male.

## Horses—

2 yr. old stallion .....	10
3 yr. old stallion .....	30
4 yr. old stallion .....	75

## Cattle—

Yearling bull.....	30
2 yr. old bull or over.....	60-75

## Hogs—

Boar pig.....	15
Yearling boar or over.....	40

## Sheep—

Lamb ram.....	20
Yearling ram or over.....	50

Chickens (cock).....10-15

Turkeys (Tom).....15

Geese (Gander).....2-3

Ducks (Drake)..... 7

Guinea .....3

**SOUTH DAKOTA LIVESTOCK BREEDERS' ASSOCIATIONS**

South Dakota Improved Livestock Breeders' Association,  
J. W. Wilson, Brookings, Secretary.

Shorthorn Breeders' Association,  
D. E. McMoines, Huron, Secretary.

Hereford Breeders' Association,  
J. H. St. Clair, Beresford, Secretary.

Holstein Breeders' Association,  
P. R. Crothers, Badger, Secretary.

Western Livestock Breeders' Association,  
C. F. Stewart, Buffalo Gap, Secretary.

Poland-China Breeders' Association,  
C. W. Stanley, Dolton, Secretary.

Hampshire Swine Breeders' Association,  
E. P. Sand, Mitchell, Secretary.

State Poultry Association,  
Dr. M. W. Myler, Mitchell, Secretary.

# **LIVESTOCK EXHIBIT CLASSIFICATIONS AND TERMS**

(Some of the State Fair Regulations as to Livestock Classes)

**Horses:** The base date for computing ages is September 1.

**Cattle:** The base date for computing ages is September 1, except for Junior classes which is January 1. With September 1 as the base date, a senior calf or yearling would be born between September 1 and January 1, while a junior calf or yearling would be born between January 1 and September 1.

**Get of Sire**—Consists of 4 animals, any age, either sex.

**Produce of Dam**—Consists of 2 animals of any age, either sex.

**Aged Herd**—Bull 2 yrs. old, one aged cow, one two year old heifer, one yearling heifer and one heifer under one year old.

**Young Herd**—Bull over one year and under two years, two heifers over one year and under two years, two heifers under one year; all except bull to be bred by exhibitor.

**Calf Herd**—Bull under one year old and two heifers under one year old; all animals to be owned and bred by exhibitor.

**Junior Champion**—Competed for by junior and senior calves and yearlings.

**Senior Champion**—Competed for by two-year olds and over.

**Grand Champion**—Competed for by junior and senior champions.

**Hogs:** The base date for computing ages is September 1, except for Junior classes which is March 1.

**Old Herds**—Boar and 3 sows farrowed before September 1 of year previous.

**Young Herd**—Boar and 3 sows farrowed on or after September 1 of year previous.

**Get of Sire**—Consist of 4 animals, any age, get of one boar.

**Produce of Dam**—Consist of 4 animals, any age, produced by one sow.

**Junior Champion**—Must have been farrowed on or after September 1 of year previous.

**Sheep:** The base date for computing ages is September 1.

**Exhibitor's Flock**—Ram any age, ewe two years old or over, ewe one year old and under two, and ewe under one year.

**Breeder's Flock**—Ram and 4 ewes, any age, bred and owned by exhibitor.

**Get of Sire**—Consist of 4 lambs, either sex, get of one ram, bred and owned by exhibitor.



**VALUE OF A PUREBRED SIRE**  
**Selling Prices**

Age of Colt	Purebred Stallion	Grade Stallion	Difference in favor of Purebred
4-6 mos. ....	\$ 78.77	\$ 51.25	\$ 27.52
1 year .....	132.84	85.00	47.84
4 years .....	303.00	200.20	102.80

("The data was obtained by writing the stallion owners of Wisconsin for the selling prices of their foals in 1911.")

—Dr. Alexander.

**ESSENTIALS OF A BULL ASSOCIATION**

1. Three farmers or three blocks of farmers may form an association.

2. Each farmer of each block of farmers purchases a purebred bull belonging to the same breed as mutually agreed upon.

3. These bulls should be of standard approved type, breeding and of perfect health.

4. Each farmer or each block of farmers mutually agrees to exchange bulls about each three years.

5. If abortion or any other contagious disease appears, each farmer or block of farmers agrees to do everything possible to stamp it out and stop the use of the infected bull as long as there is danger from the contagion.

6. By this plan each farmer may have the use of a high quality purebred sire at a very low cost.

\*A block is based on 40 to 50 cows.





## AVERAGE WEIGHT OF FEEDING STUFFS

Feeding Stuff	One Quart Weighs Pounds	One Pound Measures Quarts
Corn, whole .....	1.7	0.6
Corn, meal .....	1.5	0.7
Corn, bran .....	0.5	2.0
Corn and cob meal ....	1.4	0.7
Gluten meal .....	1.7	0.6
Gluten feed .....	1.3	0.8
Germ meal .....	1.4	0.7
Wheat, whole .....	2.0	0.5
Wheat, ground .....	1.7	0.5
Wheat, bran .....	0.5	2.0
Wheat middlings (stand.)	0.8	1.3
Oats, whole .....	1.0	1.0
Oats, ground .....	0.7	1.4
Rye, whole .....	1.7	0.6
Rye, meal .....	1.5	0.7
Rye, bran .....	0.6	1.8
Rye, middlings .....	1.6	0.6
Barley, whole .....	1.5	0.7
Barley, meal .....	1.1	0.9
Buckwheat .....	1.4	0.7
Buckwheat middlings ..	0.9	1.1
Soy beans .....	1.8	0.6
Alfalfa meal .....	0.6	1.7
Molasses .....	3.0	0.3
Linseed meal, old process	1.1	0.9
Linseed meal, new process	0.9	1.1
Cotton-seed meal .....	1.5	0.7

## DIGESTIBLE NUTRIENTS IN A POUND OF FEEDING STUFF

Feeds		Digestible		Fat	Nutritive Ratio: 1 to
	Pro.	C-H			
Concentrates—					
Corn .....	.076	.668		.046	10.2
Corn and cob meal .....	.061	.637		.037	11.8
Gluten meal .....	.302	.439		.044	1.8
Gluten feed .....	.216	.519		.032	2.7
Hominy feed .....	.070	.612		.073	11.1
Germ oil meal .....	.165	.426		.104	4.0
Wheat .....	.092	.675		.015	7.7
Wheat bran .....	.125	.416		.030	3.9
Wheat middlings (shorts) .....	.134	.462		.043	4.2
Red dog flour .....	.148	.565		.035	4.4
Wheat screenings .....	.096	.473		.036	5.8
Oats .....	.097	.521		.038	6.3
Barley .....	.090	.668		.016	7.8
Emmer (speltz) .....	.095	.632		.017	7.1
Buckwheat .....	.081	.497		.025	6.8
Buckwheat middlings .....	.246	.383		.061	2.1
Rye .....	.099	.684		.012	7.2
Rye middlings .....	.126	.555		.031	5.0
Rye bran .....	.122	.566		.028	5.2
Rye feed (shorts and bran) .....	.122	.558		.029	5.1

Kafir grain	.090	.658	.023	7.9
Milo grain	.087	.662	.022	8.2
Feterita grain	.093	.666	.025	7.8
Kaoliang grain	.085	.670	.033	8.8
Sorghum grain	.075	.662	.026	9.6
Millet seed	.084	.637	.024	8.2
Flax seed	.206	.170	.290	4.0
Linseed meal (o. p.)	.302	.326	.067	1.6
Linseed meal (n. p.)	.317	.379	.028	1.4
Cottonseed meal	.370	.218	.086	1.1
Soybean	.307	.228	.144	1.8
Sunflower seed with hulls	.135	.381	.203	6.2
Skim milk	.036	.051	.002	1.5
Tankage (60% protein)	.587		.126	0.5
Molasses (cane or blackstrap)	.010	.582		58.2
Roughages (cured)				
Corn fodder	.030	.473	.015	16.9
Corn stover	.021	.424	.007	21.0
Sorghum fodder	.028	.448	.020	17.6
Kafir fodder	.041	.450	.017	11.9
Milo fodder	.019	.363	.028	22.4
Timothy	.030	.428	.012	15.2
Prairie hay	.040	.414	.011	11.0
Millet	.050	.460	.018	10.0
Red Top	.046	.459	.012	10.6
Oat hay	.045	.381	.017	9.3

## DIGESTIBLE NUTRIENTS IN A POUND OF FEEDING STUFF (Continued)

Feeds	Digestible			Nutritive Ratio 1 to
	Pro.	C-H	Fat	
Alfalfa .....	.106	.390	.009	3.9
Red clover .....	.076	.393	.018	5.7
Alsike clover .....	.079	.369	.011	5.0
Sweet clover .....	.109	.382	.007	3.7
Soy beans .....	.117	.392	.012	3.6
Peas and oats .....	.083	.371	.015	4.9
Clover and timothy .....	.040	.397	.011	10.6
Wheat straw .....	.007	.351	.005	51.7
Oat straw .....	.022	.343	.012	16.8
Barley straw .....	.009	.402	.006	46.2
Roughages (green)				
Corn fodder .....	.010	.128	.004	13.7
Kaffir fodder .....	.011	.124	.004	12.1
Blue grass .....	.023	.148	.006	7.0
Orchard grass .....	.017	.130	.006	8.5
Timothy .....	.015	.193	.006	13.8
Alfalfa .....	.033	.104	.004	3.4
Red clover .....	.027	.130	.006	5.3
Sweet clover .....	.033	.103	.003	3.3
Alsike clover .....	.027	.118	.004	4.7

Clover and mixed grasses	.022	.141	.006	0
Soy beans and corn	.017	.136	.006	2.8
Peas and oats	.024	.106	.006	5.0
Peas oats and rape	.023	.073	.005	3.7
Rape	.026	.100	.003	4.1
Silage—				
Corn	.011	.150	.007	15.1
Sorghum	.006	.116	.005	21.2
Alfalfa	.012	.078	.006	7.7
Corn and soy beans	.016	.138	.008	9.8
Miscellaneous—				
Sugar beet	.017	.054	.001	3.3
Mangel	.008	.064	.001	8.2
Turnip	.018	.073	.001	4.2
Pumpkin	.011	.045	.005	5.1

## COST OF ONE POUND AT A GIVEN PRICE AND WEIGHT PER BUSHEL

When a Bushel Costs	When a Bushel Weighs					
	32 lbs.	40 lbs.	48 lbs.	50 lbs.	56 lbs.	60 lbs.
Costs	1 lb. Costs	1 lb. Costs	1 lb. Costs	1 lb. Costs	1 lb. Costs	1 lb. Costs
Cents	Cents	Cents	Cents	Cents	Cents	Cents
30.....	.937	.750	.625	.60	.536	.500
32.....	1.000	.800	.667	.64	.571	.533
34.....	1.062	.850	.708	.68	.607	.567
36.....	1.125	.900	.750	.72	.643	.600
38.....	1.187	.950	.792	.76	.678	.633
40.....	1.250	1.000	.833	.80	.714	.666
42.....	1.312	1.050	.875	.84	.750	.700
44.....	1.375	1.100	.917	.88	.786	.733
46.....	1.437	1.150	.958	.92	.821	.767
48.....	1.500	1.200	1.000	.96	.857	.800
50.....	1.562	1.250	1.042	1.00	.893	.833
52.....	1.625	1.300	1.083	1.04	.928	.867
54.....	1.687	1.350	1.125	1.08	.964	.900
56.....	1.750	1.400	1.167	1.12	.999	.933
58.....	1.812	1.450	1.208	1.16	1.036	.967
60.....	1.875	1.500	1.250	1.20	1.071	1.000
62.....	1.937	1.550	1.292	1.24	1.107	1.033
64.....	2.000	1.600	1.333	1.28	1.143	1.067
66.....	2.062	1.650	1.375	1.32	1.178	1.100
68.....	2.125	1.700	1.417	1.36	1.214	1.133
70.....	2.187	1.750	1.458	1.40	1.250	1.167
						1.000



72.....	2.250	1.800	1.500	1.44	1.286	1.200	1.288
74.....	2.312	1.850	1.542	1.48	1.321	1.233	1.057
76.....	2.375	1.900	1.583	1.52	1.357	1.267	1.086
78.....	2.437	1.950	1.625	1.56	1.393	1.300	1.114
80.....	2.500	2.000	1.667	1.60	1.428	1.333	1.143
82.....	2.562	2.050	1.708	1.64	1.464	1.367	1.171
84.....	2.625	2.100	1.750	1.68	1.500	1.400	1.200
86.....	2.687	2.150	1.792	1.72	1.536	1.433	1.228
88.....	2.750	2.200	1.833	1.76	1.571	1.467	1.257
90.....	2.812	2.250	1.875	1.80	1.607	1.500	1.286
92.....	2.875	2.300	1.917	1.84	1.633	1.533	1.314
94.....	2.937	2.350	1.958	1.88	1.678	1.567	1.343
96.....	3.000	2.400	2.000	1.92	1.714	1.600	1.371
98.....	3.062	2.450	2.041	1.96	1.750	1.633	1.400
100.....	3.125	2.500	2.083	2.00	1.786	1.667	1.429

NOTE—The above table is an aid in determining the cost of a ration. If it is desired to ascertain the cost of a pound of oats when it sells for 50 cents per bushel, follow down the column under the heading "When a Bushel Costs" until the number 50 is reached; then to the right to the column headed "32" because there are 32 pounds in a bushel, where 1.562 is given as the price of 1 pound of oats.

# **COST OF PASTURE PER COW PER DAY**

Interest at 6 per cent on the value of the land with pasture season 150 days.

Acres per cow	Value of Land per Acre						
	\$25 Cents	\$50 Cents	\$100 Cents	\$150 Cents	\$200 Cents	\$250 Cents	\$300 Cents
1	1	2	4	6	8	10	12
1½	1½	3	6	9	12	15	18
2	2	4	8	12	16	20	24
2½	2½	5	10	15	20	25	30
3	3	6	12	18	24	30	36
3½	3½	7	14	21	28	35	42
4	4	8	16	24	32	40	48

## PRECAUTIONS IN CALF FEEDING

1. Feed regularly.
2. Feed at proper temperature (100° F)
3. Feed individually. Feed sweet milk.
4. Do not over-feed.
5. Make all changes gradually.
6. Give access to fresh water and salt.
7. Keep all utensils clean.
8. Provide clean pens with plenty of light and sunshine.
9. Provide plenty of bedding.
10. Keep in place where temperature does not vary too much.

## FEEDING CALVES SKIM MILK

1. Let calf have colostrum or fresh milk; take from mother not later than fifth day.
2. Feed whole milk for two weeks; gradually change to skim milk, using 10 days in making the change.
3. Start with 8 to 10 pounds and gradually increase to 12 to 16 pounds at six months.
4. Begin feeding a ground grain mixture at two weeks of age. Feed only what calf will readily clean up shortly after each feeding. Following grain mixtures are suggestive:

### No. 1.

Ground corn .....	40 lbs.
Ground oats .....	60 lbs.

### No. 2

Cracked corn .....	30 lbs.
Ground oats .....	30 lbs.
Bran .....	30 lbs.
Oil Meal .....	10 lbs.

5. Provide good alfalfa or clover hay at all times, good pasture when possible.

# **APPROXIMATE YEARLY COST OF FEEDING LIVE STOCK**

## **Draft Horse:**

6 mo. full feed of grain.	
Hay 10 lbs. grain 16 lbs.	
Hay at \$20.00 ton (12 months) .....	\$ 36.50
Oats at 50c bu. 6 months .....	45.00
Oats—6 mo. 1-2 full feed .....	22.50
Total .....	\$104.00

## **Light Horse:**

Hay (Same as draft) .....	\$36.50
Oats 10 lbs. daily 6 mo. ....	28.00
Oats 5 lbs daily 6 mo. ....	14.00
Total .....	\$78.00

## **Dairy Cow:**

8 mo. feed, 4 mo. pasture.	
Silage 30 lbs. daily, \$8.00 ton .....	\$28.80
Alfalfa hay 8 lbs. \$20.00 ton .....	19.20
Grain ground 8 lbs. \$45.00 ton .....	43.20
Pasture 4 months .....	6.00
Total .....	\$97.20

## **Beef Steer or Cow:**

6 mo. feed, 6 mo. pasture.	
Silage 50 lbs. daily \$8.00 .....	\$36.00
Oil meal 2 lbs. daily \$65.00 .....	11.70
Pasture .....	6.00
Total .....	\$53.70

## **Steer on Range:**

12 mo. pasture .....	\$ 6.00
Two ton hay .....	20.00
Total .....	\$26.00

## **Sheep Range:**

12 mo. pasture .....	\$1.20
600 lbs. hay at \$10.00 .....	3.00
Grain 100 lbs. at \$3.00 .....	3.00
Total .....	\$7.20

## **Farm Sheep:**

6 mo. pasture .....	\$1.20
Alfalfa Hay 3 lbs. daily \$20.00 ton ..	5.40
Grain 1-2 lb. 200 days \$45.00 ton .....	2.25
Total .....	\$8.85

## **Hogs:**

1/6 sow feed 3 months 150 lbs. grain ..	\$3.37
300 lbs. skim milk .....	2.25
Pasture and 1/2 grain feed 4 mo.	
Pasture 10 hogs to acre at \$20 acre.	2.00
Self fed grain 1/2 full feed 360 lbs...	8.10
Five Months—	
Ear corn, 8 lbs. daily, 1200 lbs ....	27.00
Self fed Tankage 100 lbs. ....	5.50
Total cost .....	\$48.22

Classes	Sub-classes	Height. Hands	Weight Pounds
Draft Horses	Light Draft	15-3 to 16-2	1600 to 1750
	Heavy Draft	16 to 17-2	1750 to 2200
	Loggers	16-1 to 17-2	1700 to 2200
Chunks	Eastern and Export Chunks	15 to 16	1300 to 1550
	Farm Chunks	15 to 15-3	1200 to 1400
	Southern Chunks	15 to 15-3	800 to 1250
Wagon Horses	Expressers	15-3 to 16-2	1350 to 1500
	Delivery Wagon	15 to 16	1100 to 1400
	Artillery Horses	15-1 to 16	1050 to 1200
	Fire Horses	15 to 17-2	1200 to 1700
Carriage Horses	Coach	15-1 to 16-1	1100 to 1250
	Cobs	14-1 to 15-1	900 to 1150
	Park Horses	15 to 15-3	1000 to 1150
	Cab	15-2 to 16-1	1050 to 1200
Road Horses	Runabout	14-3 to 15-2	900 to 1050
	Roadster	15 to 16	900 to 1150
Saddle Horses	Five-Gaited Saddle	15 to 16	900 to 1200
	Three-Gaited Saddle	14-3 to 16	900 to 1200
	Hunters (Light—Middle—Heavy)	15-2 to 16-1	1000 to 1250
	Cavalry Horses	15 to 15-3	950 to 1100
	Polo Ponies	14 to 14-2	850 to 1000
Mining Mules		12 to 16	600 to 1350
Cotton Mules		13-2 to 15-2	750 to 1100
Sugar Mules		16 to 17	1150 to 1300
Farm Mules		15-2 to 16	900 to 1250
Draft Mules		16 to 17-2	1200 to 1600

Ill. Bul. No. 122.

## SUGGESTED RATIONS FOR HORSE FEEDING

Type of Work	Grain		Roughage	
Colt (at weaning time)	.....	2 lbs. oats	.....	Roughage
Colt (one year old)	.....	4 lbs. oats	.....	Hay ad. lib.
Horse (two year old)	.....	6 lbs. oats	.....	Hay ad. lib.
Rations for 1000 lb. horse—				
Maintenance for Idle Horse	5 lbs. ear corn	3 lbs. alfalfa hay		
	4 lbs. oats or rolled barley	9 lbs. corn stover		
		4 lbs. clover hay		
		10 lbs. oats straw		
		4 lbs. alfalfa hay		
		14 lbs. corn fodder		
Very Light Work	10 lbs. ear corn	5 lbs. alfalfa hay		
		5 lbs. timothy hay		
	8 lbs. oats	4 lbs. alfalfa hay		
		6 lbs. timothy hay		
	8 lbs. rolled barley	4 lbs. alfalfa hay		
		5 lbs. prairie hay		
Medium Work	13 lbs. ear corn	6 lbs. alfalfa hay		
		7 lbs. timothy hay		
	12 lbs. oats	11 lbs. timothy hay		
	10 lbs. rolled barley	6 lbs. alfalfa hay		
		5 lbs. prairie hay		



# Severe Work

12 lbs. shelled corn	12 lbs. alfalfa hay
2 lbs. bran	4 lbs. corn stover
12 lbs. oats	8 lbs. timothy hay
2 lbs. bran	5 lbs. clover hay
10 lbs. rolled barley	8 lbs. alfalfa hay
2 lbs. gluten meal	6 lbs. prairie hay

All feeds must be clean. For every 100 lbs. increase in liveweight add 10% to the ration. Figures based on U. S. Farmers' Bulletin 1030.

## ALFALFA VS. PRAIRIE AND TIMOTHY HAY FOR HORSES (140 day trial)

Horses in each lot	Average ration lbs.	Initial weight	Av. Gain or loss per head	Daily cost of feed per 1000 lbs. liveweight
17	Alfalfa hay 10 Shelled corn 8 Oats ..... 2	1163	25.6	(cents) 12.95
74	Prairie hay .14 Corn ..... 4 Oats ..... 8	1185	-12.9	18.86
76	Timothy hay 14 Corn ..... 4 Oats ..... 8	1159	- 7.7	19.21

Alfalfa fed horses showed no shortness of wind, softness, lack of endurance or excess urination.

—Kan. Bul. 186.





# \*RANGE PRODUCTION OF BEEF--MARKETING AT DIFFERENT AGES (Based on Range with 360 Head Capacity)

13.4

Cattle Marketed as	Range Capacity (360 Head)	Head Marketable Annually	Average Weight	Total Weight
3 year olds	119 cows (83 calves) 81 yearlings 79 2-yr. olds 77 3-yr. olds	77	1140	87,780
2 year olds	151 cows (106 calves) 103 yearlings 101 2-yr. olds	101	940	94,940
Yearlings	210 cows (147 calves) 145 yearlings	145	700	101,500
Calves	360 cows (252 calves)	252	400	100,800

\*John T. Caine, Ill., 21st Annual Convention, Amer. Nat'l. Livestock Assoc.

# GRAIN REQUIREMENTS FOR FATTENING STEERS

Grain required for 100 pounds gain fattening steers in feed lot different periods.

Feeding Period	Grain for 100 lbs. gain	Increase of feed required
Up to 56 days.....	730 lbs. of grain	10 per cent
Up to 84 days.....	807 lbs. of grain	15 per cent
Up to 112 days.....	840 lbs. of grain	23 per cent
Up to 140 days.....	901 lbs. of grain	27 per cent
Up to 168 days.....	927 lbs. of grain	37 per cent
Up to 182 days.....	1000 lbs. of grain	

## Types and Market Classes of Livestock—Vaughn.

### WINTERING STEERS (90 day period—No grain fed)

Feeds per Head Consumed Daily	Daily Gain Lbs.	Total Gain Per Head	Pounds feed for 100 lbs. gain
Corn Silage .....	2.4	216	2600
Fodder silage .....	1.94	175	2300
Corn fodder .....	1.76	158	1600
Corn silage .....	1.25	112	Silage 2500
Prairie hay .....			Hay 770
Millet .....	.63	14	13200

Steers weighed average of 775 lbs. each.

S. Dak. Bul. 137.

## ROOTS VS. CORN SILAGE FOR FATTENING STEERS

Daily Allowance per Head lbs.	Daily Gain Lbs.	Lbs. Feed for 100 Lbs. Gain		
		Concentrates	Prairie Hay	Silage or Roots
Corn Silage .....	7.	835	227	277
Prairie Hay .....	5.8			
Sugar Beets .....	6.3	823	217	248
Prairie Hay .....	5.5			
Mangels .....	9.	813	284	343
Prairie Hay .....	7.4			
Stock Beets .....	8.9	873	257	374
Prairie Hay .....	6.1			

90 day feeding trial; 4 yearling steers averaging 800 lbs. in each lot; concentrates consumed daily by each steer were 19.4 lbs. shelled corn and 1.7 linseed meal.

S. Dak. Bul. 137.

## STEER FEEDING RESULTS—SOUTH DAKOTA 1914

Preliminary Feeding Period—91 days Feeds fed—	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
	Corn Silage	Corn Silage Red Clover Hay	Corn Silage Sweet Clover Hay	Corn Silage Alfalfa Hay	Corn Silage Prairie Hay
Av. daily gain	2.32	2.29	2.45	2.49	2.01
Total gain per head	211	208	223	227	183
Cost per 100 lbs. gain.	\$4.03	\$4.40	\$4.34	\$4.30	\$4.70
Feed for 100 lbs. gain, s.	2700	2500	2300	2000	2900
		s. h.	s. h.	s. h.	s. h.
		150	150	160	150
Fattening Period— 101 days					
Feeds fed daily (lbs.)—		Ground corn 15.7	Ground oats 15	Ground Barley 14.8	Ground Speltz 16
Corn Silage	56	17.4	17	14.2	17
Oil Meal	2.93	1.5	1.5	1.5	1.7
Av. Daily gain	2.24	2.26	1.78	2.28	2.24
Total gain per head	227	228	180	231	226
Cost per 100 lbs. gain	\$6.10	\$9.37	\$11.65	\$9.65	\$9.47
Feed for 100 lbs. gain					
Corn silage	2500	770	970	760	770
Oil meal	100	7	860	720	700
Ground feed		690	8	7	7
Av. cost per 100 lbs. gain during 192 days	\$5.10	\$7.20	\$7.60	\$7.00	\$7.38

Four 775 lb. steers in each lot. Silage valued at \$3.00 per ton, leguminous hays at \$10.00 per ton, prairie hay at \$6.00 per ton, oil meal at \$36.00 per ton and ground grain at \$1.00 per cwt.

S. Dak. Bul. 169.

**SUGGESTED RATIONS FOR BEEF CATTLE**  
**Wintering Breeding Cows—**

No. 1.

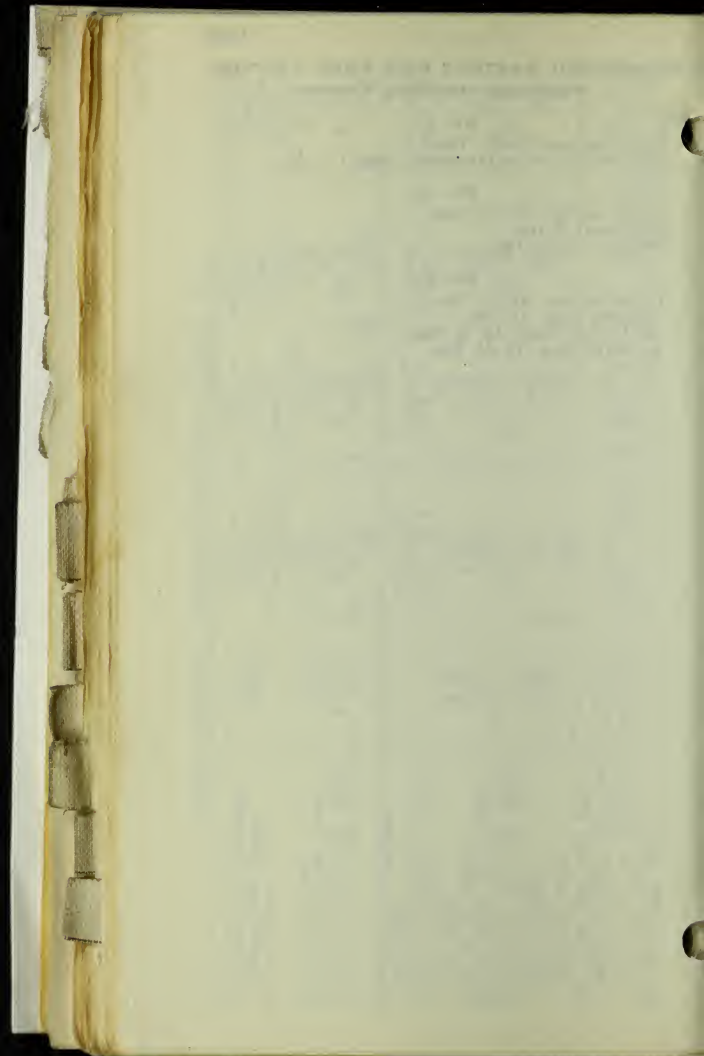
Corn silage 56-60 lbs.  
Oil meal (or cottonseed meal) 1 lb.

No. 2.

Corn silage 25-35 lbs.  
Oil meal 2 lbs.  
Straw 10-15 lbs.

No. 3.

Corn silage 30-40 lbs.  
Alfalfa hay 10 lbs.  
or Clover hay 10-15 lbs.  
or wild hay 10-15 lbs.





## LIVESTOCK BREED ASSOCIATIONS

## Horses—

- Percheron Society of America,  
Wayne Dinsmore, Chicago, Ill.  
American Association of Importers and  
Breeders of Belgian Draft Horses,  
J. D. Connor, Jr., Wabash, Ind.  
American Clydesdale Association,  
R. B. Ogilvie, Chicago, Ill.  
The American Shire Horse Association,  
W. G. Lynch, Tonica, Ill.  
National French Draft Horse Association,  
C. E. Stubbs, Fairfield, Iowa.  
American Suffolk Horse Association,  
A. Graham Galbraith, DeKalb, Ill.  
American Trotter Register Association,  
Wm. H. Knight, 355 Dearborn St.,  
Chicago, Ill.  
American Saddle Horse Breeders Association,  
R. H. Lilliard, Louisville, Ky.  
American Shetland Pony Club,  
Julia M. Wade, LaFayette, Ind.

## Cattle—

- American Shorthorn Breeder's Association,  
F. W. Harding, Chicago, Ill.  
American Hereford Cattle Breeders Association,  
R. J. Kinzer, Kansas City, Mo.  
American Aberdeen-Angus Breeders Association,  
Charles Gray, Chicago, Ill.  
American Galloway Breeders Association,  
R. W. Brown, Carrolton, Mo.  
The Polled Durham Breeders Association,  
J. H. Martz, Grenville, Ohio.  
American Polled Hereford Breeders Association,  
B. O. Gammon, Des Moines, Ia.  
Red Polled Cattle Club of America,  
Harley A. Martin, Gotham, Wis.  
American Guernsey Cattle Club,  
Wm. H. Caldwell, Peterboro, N. H.  
Holstein-Friesian Association of America,  
F. L. Houghton, Brattleboro, Vt.  
American Jersey Cattle Club,  
R. M. Gow, 324 W. 23 St., New York, N. Y.  
Ayrshire Breeders Association,  
J. M. Watson, Brandon, Vt.  
Brown Swiss Record Association,  
Ira Inman, Beloit, Wis.

## Hogs—

- American Berkshire Association,  
Frank S. Springer, Springfield, Ill.  
American Poland-China Record Association  
W. M. McFadden, Chicago, Ill.  
National Poland-China Record Association,  
A. M. Brown, Winchester, Ind.  
The Standard Poland-China Record Association,  
F. L. Garrett, Maryville, Mo.  
The American Duroc-Jersey Swine Breeders Association,  
Robt. J. Evans, Chicago, Ill.  
The National Duroc-Jersey Record Association,  
J. F. Pfender, Peoria, Ill.  
The Chester-White Swine Record Association,  
F. F. Moore, Rochester, Ind.  
National Mule Foot Hog Record Association,  
G. C. Kreglow, DeGraff, Ohio.  
American Hampshire Swine Association,  
E. C. Stone, Peoria, Ill.  
The American Yorkshire Club,  
Harry G. Krum, 471 Fairview N.,  
St. Paul, Minn.  
The American Tamworth Swine Record Association,  
E. N. Ball, Hamburg, Mich.

## Sheep—

- American Shropshire Registry Association,  
Julia M. Wade, LaFayette, Ind.  
American Southdown Breeders Association,  
Frank S. Springer, Springfield, Ill.  
American Hampshire Sheep Association,  
C. A. Tyler, Detroit, Mich.  
American Oxford Down Record Association,  
W. A. Shafer, Hamilton, Ohio.  
The American Cheviot Sheep Society,  
Edw. A. Stanford, Cooperstown, N. Y.  
The Continental Dorset Club,  
Edith Chidester, Mechanicsburg, Ohio.  
American Cotswold Association,  
F. W. Harding, Waukesha, Wis.  
National Lincoln Sheep Breeders Association,  
Bert Smith, Charlotte, Mich.  
✓ American Rambouillet Sheep Breeders Association,  
Dwight Lincoln, Milford Center, Ohio.  
Standard Delaine Merino Sheep Breeders Association,  
R. M. Wood, Douglas, Wyo.  
American and Delaine Merino Association,  
S. M. Cleaver, Delaware, Ohio.

**CHAMPION COWS OF THE DAIRY BREEDS****Holstein Fresian:**

Duchess Skylark Ormsby, 124514.

Milk one year; 27,761.7 lbs.

Butterfat one year; 1205.09 lbs.

**Guernsey:**

Murne Cowan, 19587

Milk one year; 24,008.4 lbs.

Butterfat one year; 1098.18 lbs.

**Jersey:**

Vive la France, 319616

Milk one year; 14,925 lbs.

Butterfat one year; 1031.64 lbs.

**Ayrshire:**

Lily of Willowmoor, 22269

Milk one year; 22,596 lbs.

Butterfat one year; 955.56 lbs.

**Brown Swiss:**

College Bravura 2d, 2577

Milk one year; 19,460.6 lbs.

Butterfat one year; 798.16 lbs.

## ADVANCED REGISTRY REQUIREMENTS (Figures Show Lbs.)

Ages	Ayrshire		Brown Swiss		Guernsey		Holstein		Jersey	
	Milk in 365 days	Fat in 365 days	Milk in 365 days	Fat in 365 days	Fat in 365 days	Fat in 7 days	Fat in 365 days	Fat in 7 days	Fat in 365 days	Fat in 7 days
2 yr. . . Jr.	6000	250.5	6000	222	250.5	7.2	250.5	12	250.5	
Sr.	6500	268.8								
3 yr. . . Jr.	7000	287.1	6429	238.4	287	8.8	287	12	287	
Sr.	7500	305.4								
4 yr. . . Jr.	8000	323.7	7286	271.3	323.5	10.4	323.5	12	323.5	
Sr.	8500	342								
5 yr. . . . .	9000	360	8143	304.1	360	12	360	12	360	
6 yr. . . . .			9000	337						

### COW TESTING ASSOCIATION REQUIREMENTS

1. There must be 26 farmers or dairymen as members, so that the tester may visit one herd for each working day in the month.
  2. The cost will be approximately \$2.50 to \$3.00 per cow and at least 350 cows must be included in the association, or a flat rate of \$35.00 to \$40.00 annually may be charged each member.
  3. The business of the association should be conducted through a well perfected organization with constitution and by-laws.
  4. A good qualified man should be hired as tester by the association.
  5. Semi-official yearly tests may be arranged for in this connection. They are carried on on two consecutive days each month. Strictly official tests are supervised daily by an official tester and are usually of 7 and 30 days duration.
  6. At times it may be advisable to test cows only once every two months. This would materially reduce the cost per member, and at the same time secure satisfactory results. Under this modified plan there should be 52 members.
- 15

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# MILKING MACHINES VS. HAND MILKING

Time Required per Milking, by Machine and by Hand, for Herds of Different Sizes.

	Hand Milking				Machine Milking			
	Number of Farms	Number of Milkers per Herd	Minutes per Cow	Number of Cows per Milker	Number of Farms	Number of Operators per Herd	Minutes per Cow	Number of Cows per Operator
15 cows and less .....	28	1.4	7.3	8.25	32	1.1	4.8	10.6
15 to 30 cows .....	63	2.4	6.85	9.7	72	1.5	4.45	15.3
30 to 50 cows .....	16	3.1	6.85	13.3	41	1.9	4.1	20.5
50 cows or more .....	6	4.3	7.1	17.0	11	2.4	3.2	27.8

U. S. Dept. Bul. 432.



## SUGGESTED DAIRY RATIONS

## 6 Mos.—1 Year of Age—

Grain—Same mixture as for calf feeding in proportion of one pound grain daily for first hundredweight of heifer and one-half pound for each additional hundredweight.

Roughage—Good pasture or all leguminous hay they will eat. With roughage other than legumes add 1 part of linseed oil meal to the grain mixture.

## Over 1 Year of Age—

Corn silage with alfalfa hay make a very good ration. With roughage other than legumes feed 2 parts ground corn, 4 parts ground oats and 1 part bran.

## DAIRY CATTLE RATIONS

## Suggestions—

1. Under most circumstances the cow should be fed all the roughage that she will eat up clean, adjusting the grain ration to the milk production.

2. A grain mixture should be fed in the proportion of 1 pound to each 3 to 4 pints or pounds of milk produced daily by the cow. Another rule is 1 pound of grain each day for every pound of butter fat produced during the week.

3. Feed all the cow will respond to in milk production. When she begins to put on flesh, change ration or cut down the grain.

4. When on pasture it is not profitable to feed a grain mixture to the average cow.

Grain Mixtures with Low Protein Roughages as Corn Silage, Corn Stover, Timothy, Prairie Hay and Millet Hay.

## No. 1.

	Lbs.
Ground Barley .....	100
Ground Corn .....	100
Ground Oats .....	300
Wheat Bran .....	100
Oil Meal .....	100

## No. 2

	Lbs.
Corn and Cob Meal .....	200
Wheat Bran .....	100
Oil Meal .....	100

Grain Mixtures with High Protein Roughages as Clover, Alfalfa or any Leguminous Hay.

## No. 1.

	Lbs.
Ground Corn .....	200
Ground Oats .....	100
Ground Barley or Speltz .....	100
Wheat Bran .....	100

## No. 2.

	Lbs.
Ground Barley, Speltz or Corn .....	300
Alfalfa Meal .....	100
Bran .....	100

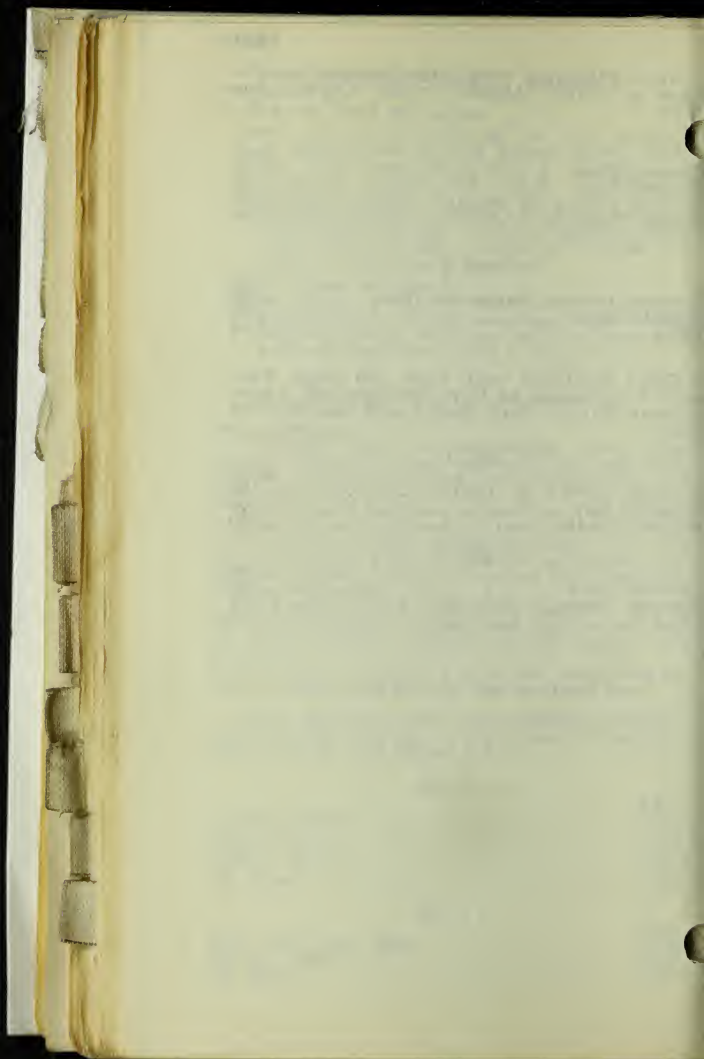
Grain Mixtures with Low and High Protein Roughages, as Corn Silages and Leguminous Hay or Corn Stover and Leguminous Hay.

## No. 1.

	Lbs.
Ground Barley or Speltz .....	100
Ground corn .....	100
Ground oats .....	300

## No. 2

	Lbs.
Ground Corn .....	200
Ground Oats .....	200
Bran .....	100



## MILK AND CREAM TESTING

### Milk Tests—Causes of poor tests—

Insufficient mixing of milk and acid, which may cause either a burned test, or leave some undissolved curd.

Too much or too little acid, the former giving a dark fat column containing charred matter and the latter a very light one with some undissolved curd at the bottom of the fat column.

Too strong or too weak acid.

Too high temperature of either acid or milk or both.

Too slow speed on tester, and using hard water.

### Cream Tests—Causes of Variation—

Change in the position of the cream screw.

Change of speed at which separator is turned. Low speed thinner cream, and higher speed thicker cream.

Vibrating bowl—uneven or unfirm foundation. Thin cream.

Dirty separator—thin cream.

Too much rinse water—thin cream.

Incorrect rate of inflow.

Temperature of milk. Warmer milk means thinner cream. Skim as soon as milked.

## FORMULA FOR STANDARDIZING MILK AND CREAM

X—represents the per cent of fat in the milk or cream to be standardized.

Y—represents the per cent of fat in the milk, cream or skim milk to be used in standardizing X.

Z—represents the per cent of fat desired in the standardized product.

(Y—Z) or (Z—Y) equals pounds of X to use.

(X—Z) or (Z—X) equals pounds of Y to use.



**SELF-FED VS. HAND FED SYSTEMS AND STANDARDS IN THE DRY LACTATION PERIOD**  
 (Table of comparisons for growing and fattening pigs. Pigs 2½ to 6 mos. old—first 100 days of feeding.)

System	Group No.		I		II		III		IV		V		VI		VII	
	Standard	No.	Free	Self	Free	Hand	Free	Hand	Free	Water	Dietrich	Water	Free	Water	Dietrich	Water
Average daily gain	.....		1.13	1.13	1.16	1.16	.95	.85	127.	.85	125.	.83	121.	.79	101.	.59
Average final weight	.....		155.	155.	158.	158.	137.	137.	127.	125.	125.	125.	121.	121.	101.	101.
Average feed eaten daily	.....		4.62	4.62	4.84	4.84	4.09	3.64	3.64	3.64	3.64	3.64	3.23	3.23	2.63	2.63
Feed required for 100 pounds gain	.....															
Shelled corn	.....		300.	300.	296.	296.	287.	304.	304.	311.	311.	311.	283.	283.	334.	334.
Wheat middlings	.....		53.	53.	64.	64.	78.	63.	63.	64.	64.	64.	59.	59.	55.	55.
Tankage	.....		55.	55.	58.	58.	65.	60.	60.	61.	61.	61.	66.	66.	57.	57.
Total all feeds	.....		408.	408.	418.	418.	430.	427.	427.	436.	436.	436.	407.	407.	446.	446.
Cost 100 pounds gain*	.....		\$ 5.90	\$ 5.90	\$ 6.07	\$ 6.07	\$ 6.35	\$ 6.21	\$ 6.21	\$ 6.35	\$ 6.35	\$ 6.35	\$ 6.03	\$ 6.03	\$ 6.42	\$ 6.42
Profit per hog**	.....		1.25	1.25	1.08	1.08	.62	.67	.67	.54	.54	.54	.77	.77	.34	.34

\*Prices of feeds: Shelled corn, 70 cents; wheat middlings \$1.45; tankage \$2.50.

\*\*Hogs selling at \$7.00, feeds as charged in gain cost.

Iowa Experiment Station.



**SUGGESTED HOG RATIONS\*****Dry Lot Feeding**

1. Breeding sows (gilts and sows should be gaining  $\frac{1}{2}$  to 1 lb. daily during pregnancy.)
  - (a) Breeding time (Flush to increase the number in litter, starting 10 days before breeding.
  - (b) During pregnancy.
    - (1) Corn (50 to 75) self fed. Ground alfalfa (50 to 25) self fed. Increase or decrease alfalfa to govern fatness of sows.
    - (2) Corn 90, tankage 10.
2. Suckling sows (limit feed for first 10 days getting onto full feed as soon as possible)
  - (1) Corn, middlings and tankage—self-fed; salt.
  - (2) Corn 70, middlings 15 and tankage 15; salt.
3. Growing and fattening hogs for market.
  - (a) Suckling pigs, 5 to 40 lbs. (fed in a creep) Corn, middlings and tankage—self-fed; salt.
  - (b) Weanling pigs, 30 to 100 lbs.
    - (1) Corn, middlings and tankage—self-fed; salt.
    - (2) Corn 80 and tankage 20.
  - (c) Shoates, 100 to 175 lbs.
    - (1) Corn, middlings, tankage—self-fed; salt.
    - (2) Corn 90 and tankage 10.
  - (d) Hogs. 175 to 350 lbs.
    - (1) Corn and tankage—self-fed; salt and charcoal.
    - (2) Corn 95 and tankage 5; salt and charcoal.
  - (e) Sows for market
    - (1) When in "run down" condition—corn and tankage—self fed, salt and charcoal; omit tankage last 2 or 3 weeks.
    - (2) When in good thrifty condition—all corn they will eat, salt.
  - (f) Stags for market (feed same as sows)

**Pasture Feeding**

1. On pastures of low protein as dry hard blue grass, millet, sorghum, timothy, rye or wheat over 8 inches and oats and barley over 5 inches. Feed practically the same rations as for dry lot.
2. On pastures of high protein as alfalfa, rape clover and young tender blue grass and timothy. Practically same feed as in dry lot, except to mature fattening hogs and brood sows. Mature fattening hogs, those



over 175 lbs. do well with just corn alone, while brood sows do well with corn 90 and tankage 10.

\*NOTE—Rations given on basis of pounds a hundred total. If skim milk is substituted for tankage, use 20 times as much or with middlings, 17 times as much. Salt ought always be placed before the hogs. Charcoal made from corn cobs is good, especially when hogs are largely on a corn feed. Barley, rye, emmer, millet kaffir corn, milo maize and sorghum seed (any of which should be ground) are all quite similar to corn and may be used as a substitute for it.

#### COMPARATIVE VALUE OF HOG FEEDS

	Pounds of pork produced per bushel of corn
Corn alone .....	10.
Corn and shorts (2 to 1) .....	12.
Corn and blue grass .....	12.5
Corn and tankage (10%) .....	14.
Corn and soy beans (7 to 1) .....	14.
Corn and clover .....	14.
Corn and milk (1 to 3) .....	17.4

COMPARATIVE VALUE OF SKIM MILK AND OTHER SUPPLEMENTS TO GRAIN FOR  
HOG FEEDING

When 100 lbs. Tankage Costs	100 lbs. Skim Milk is Worth	When 100 lbs Middlings Costs	100 lbs. Skim Milk is Worth	When 100 lbs. Oil Meal Costs	100 lbs. Skim Milk is Worth	When 100 lbs. Soy Bean Meal Costs	100 lbs. Skim Milk is Worth
\$2.00	\$ .22	\$1.00	\$ .27	\$1.50	\$ .16	\$2.00	\$ .19
2.25	.25	1.25	.33	1.75	.19	2.25	.21
2.50	.28	1.50	.40	2.00	.21	2.50	.23
2.75	.31	1.75	.47	2.25	.24	2.75	.26
3.00	.33	2.00	.54	2.50	.27	3.00	.28
3.25	.36	2.25	.61	2.75	.29	3.25	.30
3.50	.39	2.50	.67	3.00	.32	3.50	.32
3.75	.42	2.75	.74	3.25	.34	3.75	.35
4.00	.44	3.00	.81	3.50	.37	4.00	.37
4.25	.47					4.25	.39
4.50	.50					4.50	.41
4.75	.53					4.75	.43
5.00	.56					5.00	.46

# VALUE OF MILK IN HOG FEEDING

State Experimental Results—Av. Initial Wt. of Hogs 92 lbs.

Feed	Average Gain per Head (pounds)	Grain for Pound of Gain (pounds)
Lot 1—Shelled corn .....	64.5	4.68
Lot 2—Shelled corn and sweet milk .....	101.5	3.12
Lot 3—Shelled corn and sour milk .....	101.5	3.18
Lot 4—Shelled corn and buttermilk .....	103.	3.15

S. D. Exp. Sta. Bul. 136.

# KAOLIANG MEAL AND ALFALFA HAY IN HOG FEEDING

(Results of period Feb. 1 to Mar. 28, 1914, 4 pigs each lot, average initial weight was 200 lbs.)

	Average Gain per Head (pounds)	Grain for pound Gain (pounds)
Lot 1—Kaoliang Meal and Alfalfa Hay .....	54	5.81
Lot 2—Kaoliang Meal .....	48	6.61
Lot 3—Corn Meal and Alfalfa Hay .....	73	4.63
Lot 4—Corn Meal .....	-66	5.22

S. Dak. Exp. Sta. Bul. 157.

# VALUE OF FORAGE CROPS FOR HOGS (Figures obtained from 1 to 5 years results)

Crop	Number Hogs per Acre	No. Days Pasture	Pounds Gain accredited to acre of forage	Pounds of Grain per Pound of Gain
Alfalfa .....	10.3	163.	591.8	3.07
Red Clover .....	11.	133.	567.7	2.95
Rape, Oats and Clover .....	10.	90.	414.6	2.47
Rape .....	19.	98.	392.8	2.74
Rape and Oats .....	9.3	126.	354.1	3.6
Blue Grass .....	12.	165.	324.6	4.5
Sorghum .....	15.	86.5	275.	4.
Cowpeas .....	12.	32.8	212.7	3.58
Rye .....	12.	49.6	211.7	1.96
Soybeans .....	14.	31.	117.6	3.

The gains on forage were made from 20 to 30 per cent cheaper than those on dry lot feeding. The average number of hogs that may be profitably pastured on an acre of forage ranges from 8 to 14 head, depending upon abundance of forage.

Mo. Agri. Exp. Sta. Bul. 110

# HOGGING DOWN CORN

Varieties of Corn for Hogging Down and Value of Rape Supplement.

42 day feed 6 hogs in each lot av. 95 lbs. each	Minnesota 13	Wis. White Dent	Yellow Triumph Flint
	Corn Alone With Rape	Corn Alone With Rape	Corn Alone With Rape
Av. Gain per Head Lbs.	44	47	45
		57	44
			58

S. Dak. Bul. 157.

## Number Days Required for Pigs to Clean Up One Acre Corn (Hogging Down—125 lbs. pigs)

Number pigs foraging	Yield 40 bu. per acre	Yield 50 bu. per acre	Yield 60 bu. per acre	Yield 70 bu. per acre
20	Days 15	Days 19	Days 23	Days 26
40	8	9	11	14
60	5	6	8	9
80	4	5	6	7

Minn. Exp. Station.

## Comparative Value of Supplements in Hogging Down Corn (1909-11)

Supplement, if any, to Standing Corn "Hogged Down"	Initial Weight of Shotes (pounds)	Hog Gain accredited to the acre (pounds)	Cost per 100 lbs. Pork
Corn, alone .....	69	357.2	3.14
Meat meal 10% .....	69	795.0	2.43
Rape and pumpkins .....	92	651.7	1.86
Soybeans .....	81	535.7	2.73
Canadian fieldpeas .....	50	333.8	4.42
Rye, green and meat meal 10% .....	69	789.6	2.69

Ia. Exp. Sta. Bul. 143

Cost of growing corn to maturity was \$11.15 per acre.



# COMPARATIVE VALUE OF GRAINS IN SHEEP FEEDING

(110 day feeding trial)

Average Ration Lbs.	Lambs in each Lot	Initial Weight	Daily Gain Lbs.	Feed for 100 lbs. gain Grain	Hay
Oats Mixed hay	1.6 1.3	10	.25	650	535
Shelled corn Mixed hay	1.5 1.3	10	.28	561	485
Emmer Mixed hay	1.8 1.4	18	.29	660	511
Shelled corn Mixed hay	1.6 1.4	19	.32	513	462

S. Dak. Bul. 80 and 86.



## FATTENING LAMBS ON GRAIN AND RAPE PASTURE

(Av. results for 1908-09; 11 and 12. Lambs in each lot averaging 70 lbs. each and fed for 37½ days.)

Kind of Feed	Grain Consumed Lbs.	Total Gain Lbs.	Av. Daily Gain Lbs.
Rape .....		157.7	.355
Rape, pasture and shelled corn .....	242.5	148.5	.33
Rape, pasture and oats .....	292.5	185.	.405
Rape, pasture and barley .....	297.5	184.5	.40

## FATTENING LAMBS ON ALFALFA AND PRAIRIE HAY

(Results in 1908, 10 lambs each lot, averaging 87 lbs. and fed for 44 days.)

Kind of Feed	Pounds Grain Consumed	Pounds Hay Consumed	Total Gain	Cost per lb. gain in cents
Alfalfa hay and grain mixture..	967	1238	313	4.2
Prairie hay and grain mixture..	967	940	234	5.3

Grain mixture consisted of corn, oats and oil meal costing 1c per lb. The hay cost 3c per lb. Sheep valued at 7c per lb. South Dakota Experiment Station Bulletin 119.

## SUGGESTED RATIONS FOR SHEEP:

## Breeding Ewes

Feed  $\frac{1}{2}$  lb. of any of the following grain mixtures per ewe daily; also 2 lbs. sweet silage and 2 to 4 lbs. bright clean hay. Avoid feeding too much corn to breeding ewes. For suckling ewes the grain mixture may be increased to  $\frac{3}{4}$  or 1 lb. per ewe daily. Mixtures Nos. 1 and 2 recommended where good leguminous hay is fed. Mixture No. 3 also suitable for stimulating milk flow of suckling ewe.

## No. 1

Oats or ground barley.....	60 lbs.
Bran .....	40 lbs.

## No. 2

Shelled corn .....	25 lbs.
Oats .....	75 lbs.

## No. 3

Shelled corn or barley .....	45 lbs.
Oats .....	45 lbs.
Oil meal .....	10 lbs.

### MARKET CLASSIFICATION AND GRADES OF WOOL

The wool from any particular breed of sheep is not always given the same market grade. Wool is graded upon the basis of length, fineness, quality and condition. The finer the wool the more grease it has and the higher will be its percent shrinkage.

Length	Fineness or Grade	Condition
Clothing—under 2 inches in length and sound. Weak wool that is longer falls in this class.	Weak XX—Fine— $\frac{1}{2}$ blood and $\frac{1}{4}$ blood	Domestic—Clean and bright from sheep under best of management.
Delaine—fine wool that is 2 to 3 inches long.	Fine and medium	Territory—Dirty or discolored, produced under range condition.
Combing—over 3 inches long.	Fine— $\frac{1}{2}$ blood— $\frac{3}{8}$ blood— $\frac{1}{4}$ blood and braid.	Blanket and Carpet—Poorest kinds of wool, worst features being presence of hemp or dead fibres.
Burry, cotted, seedy, chaffy or black wool represent lowest grades.	Fine or black wool represent lowest grades.	

Merinos and Rambouillets—produce wool of higher grade than  $\frac{1}{2}$  blood. Southdown—produce wool of  $\frac{3}{8}$  blood, usually clothing. Shropshire—produce wool of  $\frac{3}{8}$  blood, combing or clothing. Oxford, Hampshire, Cheviot and Dorset—produce wool of  $\frac{1}{4}$  blood or higher. Cotswolds, Lincolns and Leicester—produce wool of  $\frac{1}{4}$  blood or braid combing.

## PRINCIPLES OF HOUSING POULTRY

### 1. Fresh Air—

May be had through open front houses, allowing 1 square foot of opening to 20 square feet of floor space. Openings should be fitted with frames covered with muslin or burlap for severe or stormy weather. This type of house should be 14 to 20 feet deep with back, ends and roof as near air tight as possible.

### 2. Dryness—

is secured by abundance of fresh air and sunlight at all times. Buildings should be located on high ground with good air and surface drainage. Floors should be 6 to 10 inches above outside ground level.

### 3. Sunlight—

is of vital importance and windows should be arranged to admit all sunshine possible. Face buildings south and use two sash windows placing them so as to extend from a little below the eaves to within 2 feet of the floor. Use about one square foot of glass to 10 square feet of floor space.

### 4. Floor Space—Depends upon breeds.

Light breeds require 3 square feet floor space per bird. General purpose breeds require 4 square feet floor space per bird. Meat breeds require 5 square feet floor space per bird.

### 5. Arrangement—

Houses should be 7 feet in the clear at the highest point. Roosts should be placed at rear of house and about 8 inches above drop boards, which should be about 3 feet above the floor. Nests should be arranged along the side walls and so that they may be easily removed for cleaning purposes. Allow one nest to each 5 birds, if trap-nesting 1 nest to each 3 birds. Feed hoppers and drinking fountains should be placed in center of house and raised about 18 inches above the floor to prevent hens scratching filth into them.

## CLASSES AND BREEDS OF POULTRY

## Chickens:

Class	Standard Weights—Pounds		
	Cockerel	Cock	Pullet
1. Meat Producing (3 most popular breeds)—			
Brahma .....	9-10	11-12	7-8
Cochin .....	9	11	7
Langshan .....	8	9.5	6.5
			8.5-9.5
			9.5
			7.5

## 2. General Purpose (4 most popular breeds)—

Plymouth Rock .....	8	9.5	6	7.5
Rhode Island Red .....	7.5	8.5	5	6.5
Wyandotte .....	7.5	8.5	5.5	6.5
Orpington .....	8.5	10	7	8

## 3. Egg Producing (4 most popular breeds)—

Leghorn .....	4.5	5.5	3.5	4
Ancona .....	4.5	5.5	3.5	4.5
Minorca .....	6.5-7.5	8-9	5.5-6.5	6.5-7.5
Andalusian .....	5	6	4	5

## Turkeys (3 most popular breeds)—

Bronze .....	25	36	16	20
White .....	20	28	14	18
Bourbon Red .....	20	30	12	18

Ducks (3 most popular breeds)—

	Young Drake	Adult Drake	Young Duck	Adult Duck
Pekin .....	8	9	7	8
Rouen .....	8	9	7	8
Muscovy .....	8	10	6	7

Geese (3 most popular breeds)—

	Young Gander	Adult Gander	Young Goose	Adult Goose
Embden .....	18	20	16	18
Toulouse .....	20	26	16	20
Chinese .....	10	12	8	10



**ESSENTIALS IN SELECTING BREEDERS**

1. Select only fowls that conform to breed standard.
2. Constitutional vigor, size and shape, reproducing qualities and plumage color are of utmost importance.
3. In selecting fowls for egg production look for fowls with:
  - (1) **Head** that is fairly broad and deep, with a stout, well curved beak, with bright color in comb, face and wattles and bright snappy eyes.
  - (2) **Back** of fair length and good breadth.
  - (3) **Body** that is straight from front to rear with good depth from top of back at hip joint to bottom line of abdomen between the legs.
    - (a) Pelvic bones should be well spread, thin and pliable, the thinner the better. Cull out any mature fowls with pelvic bones that are crooked or over  $\frac{3}{8}$  of an inch in thickness.
    - (b) Good length between point of breast bone and points of pelvic bones indicate capacity. Any mature fowls with less than  $2\frac{1}{4}$  inches between the foregoing points should be culled from laying flock.
  - (4) **Legs** stout and of fair length, with short toe nails, the latter being indications of working fowls.



## PRACTICAL POULTRY RATIONS

## Laying Hens—

## Grain Mixture

Corn .....	10 pounds
Oats .....	10 pounds
Wheat .....	5 pounds
Wheat Bran .....	10 pounds

## Mash

Ground Oats or Barley .....	10 pounds
Corn Meal .....	10 pounds
Meat Scraps .....	5 pounds

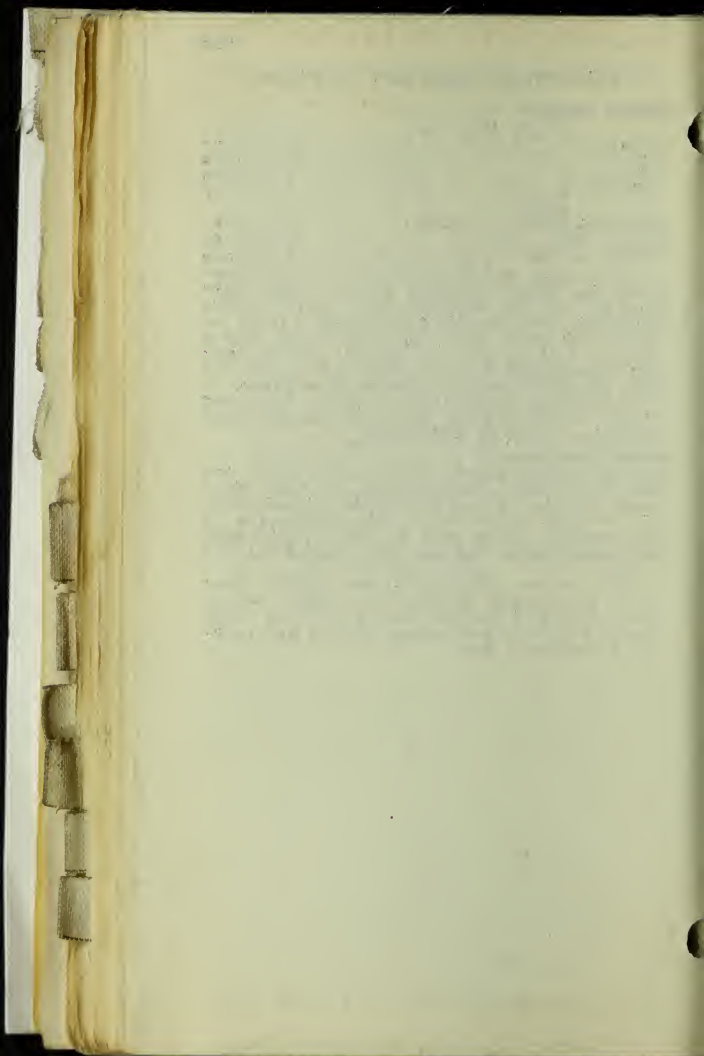
The mash should be fed in a self feeder and the grain mixture fed in deep litter lightly in the morning and heavy in the evening, the amounts of grain varied so that the hens will consume about equal parts of the grain and mash. Speltz may be substituted for the oats and barley for the wheat or corn in the grain mixture.

Supply an abundance of green feed and fresh water. Sour milk is an excellent addition if it is obtainable.

## Young Chicks—

Don't feed young chicks until they are 48 hours old. If buttermilk or sour skim milk are to be had it will be unnecessary to provide other feed until chicks are 72 hours old. It is well to have buttermilk or sour milk before the chicks at all times.

The ration suggested for laying hens will give good growth to young chicks, but oats and barley should be free from hulls and corn and wheat should be cracked to suitable size.



## 14. ANIMAL AILMENTS, DISEASES AND PARASITES

- Some reliable disinfectants
- Mixing disinfectants
- Whitewash formulas
- Suggestions for proper carcass disposal
- Directions for sending in laboratory specimens
- Temperature, pulse and respiratory table
- Suggested farmer's medicine case
- Common medicines and their actions.
- Table of proportionate doses for animals

### 14.1 Horses

- Colic
- Distemper
- Scratches
- Sore shoulders
- Thrush
- Wounds or wire cuts

### 14.2 Cattle

- Abortion
- Anthrax
- Blackleg
- Bloating
- Corn stalk disease
- Foot rot
- Hemorrhagic septicemia
- Garget
- Lice
- Lumpy jaw
- Milk fever
- Ringworm
- Scab
- Scours
  - Common
  - White
- Tuberculosis

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### **14.3 Hogs**

#### **Cholera**

Serum dosage table

Serum companies

Hemorrhagic septicemia

Lice

Mange

Necrobacillosis

Scours

Thumps

Tuberculosis

Swine conditioners

Worm remedies

### **14.4 Sheep**

Hemorrhagic septicemia

Scab

Stomach worm

Other internal parasites

### **14.5 Poultry**

Blackhead

Catarrh

Chicken pox

Cholera

Egg Bound

Gapes

Lice

Limberneck

Mites

Roup

Scaly legs

Tuberculosis

White diarrhea

**SOME RELIABLE DISINFECTANTS****Hog Dips and General Disinfectants—****Cattle and Sheep Scab—**

## MIXING DISINFECTANTS

Some of the liquid disinfectants are very hard to get in complete solution in cold or hard water, and for this reason it is best to use soft warm water whenever possible. The most difficulty will be experienced with carbolic acid when attempting to mix it with cold water. The acid settles in small globules and the water contains no disinfectant properties. The pure acid in the bottom will burn severely.

Compound cresol does not mix well with hard water. When so used, a curdled condition of the water results, and its disinfecting properties are greatly reduced. Always mix it in soft water.

The following table will be found useful for preparing disinfecting solutions of the varying strengths.

1 tablespoonful— $\frac{1}{2}$  oz.

2½	tablespoonfuls in 1 gallon	.....1%
5	tablespoonfuls in 1 gallon	.....2%
7½	tablespoonfuls in 1 gallon	.....3%
10	tablespoonfuls in 1 gallon	.....4%
12½	tablespoonfuls in 1 gallon	.....5%

## 1 teaspoonful—1-6 oz.

2	teaspoonfuls in 1 quart	.....1%
4	teaspoonfuls in 1 quart	.....2%
6	teaspoonfuls in 1 quart	.....3%
8	teaspoonfuls in 1 quart	.....4%
10	teaspoonfuls in 1 quart	.....5%

Dr. C. C. Lipp, South Dakota State College

## WHITEWASH FORMULAS

1. Half a bushel of unslaked lime. Slake with warm water; cover it during the process to keep the steam. Strain the liquid through a fine sieve strainer. Add a peck of salt previously well dissolved in warm water; three pounds of ground rice boiled to a thin paste and stir in boiling hot; half a pound of powdered Spanish whiting, and a pound of glue which has been previously dissolved over a slow fire. Add five gallons of hot water to the mixture, stir well and let it stand for a few days; cover up to protect from dirt. It should be put on hot. Coloring matter may be put in to make it of any shade, Spanish brown, yellow ochre, or common clay, etc.

It is well to always strain before using in order to prevent any gritty substance from getting into the valves of the sprayer and interfering with its proper operation. With whitewash thin and smooth, no difficulty will be experienced.

2. Slake fresh quicklime in water, and thin it to a paste or paint with skim milk. The addition of 2 or 3 handfuls of salt to a pail of the wash is beneficial. The addition of 3 ounces of chloride of lime to the gallon of whitewash makes an excellent disinfectant.



## PROPER CARCASS DISPOSAL

The carcasses of all farm animals, no matter what the cause of death, should be disposed of in such manner that there will be no danger of spreading disease. There are 2 methods in common use, the first of which is much more preferable than the second.

1. Burning—All dead farm animals should be burned. There is usually little difficulty in completely consuming the carcass if provision is made so that there is a draft of air from the bottom. The smaller animals may be placed on a metal wheel supported on several bricks, wheel acting as a grate allowing burning without hindrance. Larger animals may be placed over the crossing of two trenches dug at right angles; these trenches need be only a few inches deep and 6 or 8 feet long. Heavy sticks of wood or other supporting material should be placed across trenches to support carcass. It is understood that some attention must be given fire after once started otherwise projecting parts of carcass may not be consumed. It is also of utmost importance that burning be complete. No parts should remain unburned. Any kind of fuel will answer the purpose. Much success has resulted from use of kerosene where wood is not obtainable.

2. Burying—When this is followed, the grave must be large enough so that carcass may be placed on its side. It must be deep enough so that smaller carcasses will be covered with at least 4 ft. of earth; larger carcasses should have 6 ft. over them. It is also advisable to cover the carcass with 3 to 6 inches of fresh lime before throwing on dirt.

Under no circumstances must carcasses be thrown into streams, ponds, old wells, ravines or other out of way places. The practice of burying fowls and little pigs in the manure heap is to be condemned.

**DIRECTIONS FOR SECURING, PACKING  
AND SENDING SPECIMENS FOR EXAMI-  
NATION TO ANIMAL HEALTH LABORA-  
TORY, BROOKINGS, S. D.**

**1. Select proper tissues—**

Taking those parts that show characteristic lesions. For best results these should be procured as soon after death as possible.

**2. Prevent Putrefaction—**

Between April 1 and December 1, all tissues intended for bacteriological examination, should be packed in a container surrounded by crushed ice. Those desired for microscopic examination should be preserved in equal parts glycerine and water or in formalin solution, 1 ounce formalin in quart of water.

**3. Pack well—**

As important as securing suitable specimens. Regulations require material be packed in clean metal or glass containers about which is sufficient quantity of absorbent material to take up liquids from accidental leakage or breakage.

(1) Small samples blood may be sent in small vials, wrapped in cotton, or a few drops blood placed between two pieces of glass, allowed to dry, wrapped in cotton and mailed.

(2) Small specimens placed in bottles that are well corked and labeled, wrapped in cotton and placed in screw top mailing case or small tin or wooden box.

(3) Large specimens placed in screw top fruit jars and packed in saw dust in wooden box.

**4. Shipping—**

(1) Each specimen should be labeled for identification.

(2) Each package should contain name and address of person sending it.

(3) Each specimen should be accompanied by separate letter giving history of disease symptoms, post mortem evidences, animals lost or sick, number infected and any other available information.

**5. Remember—**

(1) Stomach contents and other fluids suspected to contain chemical poisons should be sent to the Department of Chemistry, State College.

(2) Feeds suspected to contain poisonous plants, moulds or other material of vegetable origin should be sent to the Department of Botany, State College.

**A SUGGESTED FARMER'S MEDICINE CASE**

Whenever an animal becomes suddenly and seriously ill, no time should be lost in securing a veterinarian. Many of the simple ailments are more readily recognized and yield to simple remedies. Whenever an ailment that appears simple does not show a change within a short time, a veterinarian should be called. It is well for every farmer and stockman to have a few medicines on hand for emergencies, hence this suggested list:

Blue vitriol (copper sulphate).....	2 pounds
Carbolic acid .....	$\frac{1}{2}$ pint
Castor Oil .....	$\frac{1}{2}$ pint
Compound solution of Cresol .....	1 gallon
Epsom salts .....	5 pounds
Formalin .....	1 pint
Linseed oil (raw) .....	2 quarts
Potassium Permanganate .....	$\frac{1}{4}$ pound
Sodium fluorid (talcated) .....	1 pound
Tincture of Iodine .....	4 ounces
Turpentine .....	1 quart
White lotion .....	1 pint
White liniment (modified) .....	$\frac{1}{2}$ pint
Drying or healing powder or ointment.	

**Instruments and Dressings:**

Absorbent cotton (1 lb.).  
 Bandages, 4 two inches wide, 5 yards long;  
                   and 2 one inch wide, 5 yards long.  
 Clinical thermometer (at least two).  
 Dressing forceps.  
 Graduate for measuring liquids.  
 Hoof knife.  
 Milk tube.  
 Soap (germicidal)  
 Surgeon's knife for castrating.  
 Syringes—  
     Hypodermic (10 c c)  
     Metal dose.  
     Rubber syringe (long nozzle)  
 Trocar  
 Twist

## COMMON MEDICINES AND THEIR ACTION

## Blue Vitriol (copper sulphate)—

An antiseptic astringent and mild caustic. Used to burn out proud flesh by dusting it on affected part every two or three days, depending upon how it burns. Also used for foot rot.

## Castor Oil—

Useful physic for colts, calves and hogs  
Dose for mature hog, 2 oz; colts 2 to 4 oz., calves 1 to 2 oz.

## Epsom Salts—

A good physic especially for ruminants.  
Dose for mature animals—Cow 1 to 1½ lbs., sheep 2 to 4 oz., hog 1 to 2 oz.

## Linseed Oil (raw)—

A mild physic or laxative. Dose for mature horse 1 to 2 pints.

## Potassium permanganate—

Good disinfectant used in drinking water for poultry, the proportion being 1 gallon of water to as much permanganate as will remain on a dime.

## Sodium fluorid (talcated)—

A good powder for destroying lice on poultry.

## Tincture of Iodine—

Used in destroying ring worms; used externally as a sweat blister, painting part once a day until it blisters, then grease part and permit healing.

## Turpentine—

Good for colic, bloating and intestinal worms, stimulates kidneys.

## White Lotion—

Sugar of Lead .....	1 ounce
Sulphate of Zinc .....	6 drachms
Water .....	1 pint

Shake well before using. Extensively used for wounds, sores and scratches. Can be used three times a day.

## Liniment (modified white)—

Aqua ammonia (strong) .....	2 ounces
Turpentine .....	2 ounces
Linseed oil .....	2 ounces

Shake—will blister if used freely. Can be made stronger or weaker by changing amounts of ammonia and turpentine.

## Drying and Healing Powder—

Oxide of Zinc .....	2 ounces
Calomel .....	2 ounces
Boracic Acid .....	2 ounces
Air-slacked Lime .....	2 ounces

Mix. Dust on wound. Good for galls and sores where dry dressing is desired. Can be made into an ointment by adding lard or vaseline.

# PROPORTIONATE DOSES FOR VARYING AGES OF ANIMALS

Doses	Age of Animals			
	Horse	Cow	Sheep	Hog
Full	4 years	3 years	1½ years	1½ years
$\frac{3}{4}$	3 years	2 years	1 year	1 year
$\frac{1}{2}$	2 years	1 year	9 months	9 months
$\frac{1}{4}$	1 year	9 months	6 months	6 months
$\frac{1}{6}$	6 months	6 months	3 months	3 months

This table is only suggestive. The development and physical condition of the animal as well as the effect desired must be given consideration in deciding on dose.



# TEMPERATURE, PULSE AND RESPIRATORY TABLE

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	Horses	Cattle	Sheep	Hogs	Chickens
Normal Temperature	100 to 101 F	101 to 102 F	102 to 104 F	101 to 103 F	105 to 107 F
Pulse per minute..	28 to 40	50 to 80	75 to 90	60 to 100	
Respirations per minute..	8 to 16	10 to 30	12 to 20	10 to 20	

An increase of 2 or more degrees temperature is an indication of serious trouble somewhere in the animal body. Anything causing fever causes a quickening of the pulse. Additional information is revealed by the respirations; they may be painful, shallow, jerky or otherwise abnormal.

Sub-normal temperatures are very rare, except in old or emaciated animals. Occasionally a disease may be accompanied by sub-normal temperature but such is very rare. Such a temperature is very often evidence of approaching death.

## COMMON AILMENTS AND DISEASES OF THE HORSE

A number of the ailments as azoturia, colic and founder may be avoided by proper feeding and watering.

**Feeding**—When horses are idle the grain feed should be reduced at least one half. If idle for 3 or 4 days, the horse should be brought back gradually onto full feed. An occasional bran mash in the feed is excellent. Have blue grass pasture on which horses may be turned onto at night.

**Watering**—A warm or tired horse should never be given all the water he wants to drink. A few swallows will do no harm, but cool him off first and then give him only a moderate amount of water; after having eaten his grain he can be allowed all he will drink. Very cold water is objectionable.

### Colic:

**Cause**—Errors in feeding and watering, sudden chilling, development of gas, constipation, impactions, paralysis of bowel movement, twists in intestines and parasites.

**Symptoms**—Sweating, rolling, pawing, unusual attitudes, distended abdomen.

**Treatment**—Call a veterinarian and in meantime make horse as comfortable as possible.

**Prevention**—See paragraph on feeding and watering.

### Distemper (strangles: Acute, contagious disease.

**Cause**—Due to a specific variety of pus producing bacterium.

**Symptoms**—Incubation period 4 to 8 days, nasal catarrh, cough, swelling of glands in region of throat, high fever and abscesses may develop in any part of the body but commonly in throat region.

**Treatment**—Call a veterinarian; sanitation is important; exposed horses should be immunized; the treatment for abscesses is operative.

### Scratches:

**Cause**—Exposure to mud, melting snow or fumes from decomposing manure.

**Symptoms**—Slight swelling and fever of legs below the knees and oozing through skin of a watery fluid which later removes the hair in small patches.

**Treatment**—Keep the horse in a dry clean stall out of mud and melting snow,



## COMMON AILMENTS, DISEASES AND PARASITES OF CATTLE

**Abortion, contagious:** An infectious disease caused by very small germs (*Bacillus Abortus* of Bang.)

Symptoms—Abortion, retained after-birth and failure to breed; may persist for several years.

Treatment—Absolute isolation of infected animals; extreme sanitation including disinfection of the stable, internal and external parts of the cow, disinfecting the bull and the proper disposal of aborted calf, after birth and all soiled bedding. Immunization in experimental stage. Animals usually develop immunity after one or two abortions.

**Anthrax:** An acute, infectious disease of domestic animals and man caused by anthrax bacilli.

Symptoms—Sudden death; diagnosis seldom possible in the living animal; call a veterinarian for diagnosis and management.

Post mortem—Black tarry blood that shows little or no tendency to clot. Spleen is usually considerably enlarged and its pulp much softened.

Treatment—None; prevention by immunization. A warning is issued against laymen handling carcasses in anyway such as skinning or holding post mortems where anthrax is suspected as this disease is infectious to man.

**Blackleg:** Acute infections disease of cattle and sometimes sheep. Caused by *Bacillus chauvei*.

Symptoms—High temperature, lameness, swellings in portions of body in thick layers of muscle such as upper leg, buttocks and loin; crackling of swellings; for diagnosis and management call a veterinarian.

Post Mortem—Tumors under the skin which contain a dark bloody frothy ill smelling fluid.

Treatment—none; prevent by vaccination; blackleg aggressin is in its infancy but worth a trial.

### **Bloating:**

Cause—Due to formation of large quantities of gas in the rumen which cannot readily escape. Caused more particularly by red clover and alfalfa pasture or hay when animals are unaccustomed to them, green corn, frozen cabbage and frozen rape.

remove crusts of the scabs by washing thoroughly with warm water and germicidal soap and then apply several times daily white lotion rubbing it in thoroughly.

#### **Sore Shoulders:**

**Cause**—Most generally due to poorly fitting collar or bad line of draft either high or low.

**Treatment**—Remove the cause; if galls are not bad wash with hot or cold salt water and apply oxide of zinc ointment; it may be necessary to give animal a rest. Clean collars daily.

#### **Thrush:**

**Cause**—Dirty stables, muddy roads, poor quality of horn in the feet.

**Symptoms**—Lameness, slight fever in foot, discharge of thin black pus with very offensive odor from cleft of frog.

**Treatment**—Clean stable, keep horse out of mud for few days, cut away all shreds of frog, pack cleft with cotton saturated with tincture of iodine. Renew dressing daily for several days then pack with plain cotton several days more to exclude foreign matter.

#### **Wounds or wire cuts:**

Stop the flow of blood with ice water; cleanse wound thoroughly by irrigation rather than with a sponge or cotton; remove foreign matter, shreds of skin and hair. If extensive, call a veterinarian, otherwise dress daily with a mild disinfectant (2%) and encourage healing from the bottom. Repel flies with fly oil or oil of pine tar placed about the edges of the wound but not in it. When healing has become well started, discontinue the liquid disinfectant using the healing powder instead.

**Symptoms**—Distention of abdomen, particularly in upper left portion, many times the triangular space in front of left hipbone becomes so much distended that it produces a drum-like sound when tapped with the finger. There is difficult breathing and extreme distress.

**Treatment**—Drench with one quart of 1½% formalin solution (3 tablespoonfuls of 40% formaldehyde to quart water). Dose may be repeated in an hour if necessary.

Severe cases of bloating or those in which gas forms very rapidly fail to yield to formalin treatment; these animals can only be saved by the prompt use of the trocar. It should be boiled 20 minutes, dried, wrapped in clean paper and kept in a convenient place for instant use. It should be plunged into left flank in the middle of the triangle in front of left hipbone. The point should be directed inward, downward and forward. The stylus should be removed and cannula left in position for several hours or longer if necessary.

A bit made of piece of rope or wood of suitable size kept in animal's mouth to hold it open often assists the escape of gas from the stomach.

**Corn Stalk Disease:** (see hemorrhagic septicemia)—

#### **Foot Rot:**

**Cause**—Exposure to juices from putrefying manure or mud.

**Symptoms**—Lameness and slight swelling of the foot between the claws and above the hoof.

**Treatment**—Cleanse space between the claws, remove undermined skin and horn, cleanse with 3% disinfectant, apply blue vitriol ointment and bandage entire hoof. Change daily; keep animal in dry clean stall.

**Hemorrhagic septicemia:** An acute or subacute infectious disease caused by a specific variety of germs; it is especially prevalent in the fall.

**Symptoms**—Fever, colic, swellings over the body, constipation at first, bloody feces, unusual actions.

**Post mortem**—Many of the internal organs contain hemorrhages varying in size from a pin head to a lima bean.

**Treatment**—Call a veterinarian; immunization and prevention by vaccination.

**Garget (caked udder):** May be caused by injury or exposure to cold. Some forms are of bacterial origin.

**Treatment**—Remove cow to a stall with plenty of dry bedding. Bathe udder 4 or 5 times a day in as hot water as hand can stand. Dry with a flannel and apply a salve made up of 3 parts of lard and 1 part turpentine; milk out affected part of udder. Severe cases require a veterinarian's services.

#### **Lice:**

**Treatment**—

1. Dip animals on a warm day in 3% creolin solution and repeat in 10 days.

2. Winter Treatment—Dust on and rub into skin a powder made from equal parts of flour of sulphur and sabadilla seed.

After first treatment thoroughly clean and spray stables with a disinfectant, reaching every crack and corner.

**Lumpy Jaw:** A chronic infectious disease of cattle and occasionally hogs and man caused by a low form of plant life called ray fungus.

**Symptoms**—Tumors in skin in region of head and neck and sometimes in the tongue.

**Treatment**—Call a veterinarian as treatment is surgical and medical.

**Milk Fever:** Occurs shortly after freshening, chiefly in matured cows.

**Symptoms**—Cow unconscious and paralyzed, convulsions; her position in lying is quite diagnostic.

**Treatment**—Call a veterinarian. If impossible to secure a veterinarian, inflate the udder with air through a milk tube which has previously been boiled for 20 minutes. Before inflating, the teats should be thoroughly disinfected.

**Ringworm:** Found mostly on calves in late winter and early spring and caused by a small parasite in the canals of the skin.

**Symptoms**—Scabby areas from  $\frac{1}{4}$  to 1 inch in diameter with more or less regular outline.

**Treatment**—Paint parts with tincture of iodine for 3 or 4 days.

**Scab:** Caused by a minute parasite which burrows into and under the skin.

**Symptoms**—The presence of small raised patches on skin which itch excessively; later there is an exudation of serum which dries and forms a scab, still later hair falls out; this process may continue until by spring considerable areas of the body surface are attacked. Often makes its first appearance on the neck.

**Treatment**—Dip in lime and sulphur dip.

Repeat in 10 days. When weather will not permit dipping, and scabby areas are small, hand treatment may be tried. Thoroughly clean and spray stable with lime and sulphur dip.

### **Scours—**

#### **Indigestion Scours:**

Cause—Irritating, fermenting putrefying feed or such as is not suited to age or digestive capacity of the calf. This disease is quite prevalent in young calves fed from pails.

Symptoms—Evident from name, general and rapidly increasing weakness, loss of appetite, death.

Treatment—Give one pint of sweet milk to which has been added 3 to 5 drops of formalin. Repeat 4 or 5 times daily if necessary.

**White Scours:** An acute infectious disease affecting calves foals, lambs and pigs in the order named. It is due to various bacteria—colon bacillus the main one.

Symptoms—Evident from name; extreme weakness; disease rarely lasts more than 3 or 4 days; very few cases recover.

Treatment—Call a veterinarian. Isolation and thorough disinfection. Immunization.

**Tuberculosis:** An infectious disease caused by tubercle germs.

Symptoms—Not always diagnostic; gradual loss of flesh, harsh tight skin; persistent diarrhea, cough and difficult breathing. When suspected call a veterinarian and have tuberculin test applied. Notify State Livestock Sanitary Board.

Post mortem—Tumors and nodules varying in size from a pin head to an egg, of grayish color outside, yellowish inside and often gritty; these may appear in any of the glands or internal organs.

Treatment—None. Kill infected animals.



## COMMON AILMENTS, DISEASES AND PARASITES OF HOGS

**Hog Cholera:** An infectious disease caused by a filterable virus.

**Symptoms—**

Acute—Loss of appetite, fever, emaciation, constipation at first which is later followed by diarrhea. Red spots on skin of belly.

Chronic—Same as acute except milder.

Post mortem—The evidences vary with the duration of the disease; congestion of glands connected with internal organs, small hemorrhages, ulcers in the large intestine near its attachment to small intestine.

Treatment—None. Call a veterinarian for diagnosis and immunization. Prevent by thorough sanitation of houses and lots and immunization.

### HOG CHOLERA SERUM COMPANIES

# **HOG CHOLERA SERUM DOSAGE TABLES** **Doses for Serum-alone Inoculation.**

Weight of Hog	Dose of Serum
Below 10 pounds	10 c. c.
10 to 15 pounds	15 c. c.
20 to 30 pounds	20 to 25 c. c.
40 to 75 pounds	30 c. c.
100 to 150 pounds	40 to 60 c. c.
175 pounds and over	80 c. c.

If the herd is infected, the dose or serum should be increased slightly for all apparently well hogs, and all hogs showing high temperatures or other evidence of disease should receive at least a dose and a half of serum.

## **Doses of Serum and Virus in Simultaneous Inoculation of Healthy Hogs.**

Weight of Hogs	Dose of Serum	Dose of Virus
Below 10 pounds	10 c. c.	
10 to 15 pounds	15 c. c.	$\frac{1}{4}$ c. c.
20 to 30 pounds	20 to 25 c. c.	$\frac{1}{2}$ c. c.
40 to 75 pounds	30 c. c.	1 c. c.
100 to 150 pounds	40 to 60 c. c.	2 c. c.
175 pounds and over	80 c. c.	2 c. c.

If the herd is infected, the dose of serum should be slightly increased for all apparently healthy hogs, and all those showing high temperature or other evidence of disease should receive at least a dose and a half of serum and no virus.



**Hemorrhagic septicemia (swine plague)—**

An infectious disease caused by specific variety of germs.

Symptoms—Somewhat similar to hog cholera; disease seldom occurs unless as a complication of cholera; diagnosis impossible without post mortem.

Post mortem—Many of the internal organs contain hemorrhages varying in size from a pin head to a lima bean.

Treatment—Call a veterinarian. Sanitation. Immunization gives 50% results.

**Lice:** Thoroughly spray or better dip animals in a 3% creolin solution; repeat in 10 days. As a prevention have from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch crude oil in water in the concrete hog wallow. Thoroughly clean and disinfect hog houses, sheds and pens.

**Mange:** A parasitic skin disease affecting practically all domestic animals.

Symptoms—Excessive irritation of skin, intense itching, presence of thick scabs, falling out of hair and general thriftless condition.

Treatment—Thoroughly spray or better still dip in 3% solution of liquid cresolis compositus or creolin. Repeat in 10 days. If infested area is quite small, apply creolin solution by hand. Thoroughly disinfect houses and pens.

**Neurobacillosis:** An infectious disease of hogs, sheep, cattle and horses and frequently fowls.

Cause—Germs causing this disease are frequently found in mud holes and unsanitary barn surroundings.

Symptoms—Ulcers on the mouth and tongue, abscesses on any part of the head, sore eyes, sore skin, the losing of tails; diarrhea. Ulcers on large intestine.

Treatment—Call a veterinarian; isolate all sick animals; disinfect infected pens and dip animals in 3% creolin solution. Paint lumps on head or ulcers in the mouth with tincture of iodine. Give internal antiseptic of copper sulphate (1 dram per 100 lb. pig, dissolved in a little water or milk and given internally once daily for several days depending on condition).

**Scours in sucking pigs:**

Cause—Sow's milk too rich; irritating feeds for the sows as putrefying meat, sudden change of sow's feed, caked bag or chilling.

Symptoms—Diarrhea and weakness.

Treatment—Remove cause and dose each pig with 1 teaspoonful castor oil.

**Thumps:**

Cause—Indigestion.

Symptoms—Spasmodic contraction of diaphragm.

Treatment—Prevent by proper care and feeding and plenty of exercise. Give each affected pig a dose of teaspoonful of castor oil.

**Tuberculosis:** An infectious disease.

Cause—Tubercle bacilli germs.

Symptoms—Seldom possible to diagnose in living animal.

Post mortem—Tumors and nodules varying in size from a pin head to an egg, of grayish color outside, yellowish inside and often gritty; these may appear in any of the glands or internal organs.

Treatment—None. It may be prevented by the use of sanitary feed lots and the eradication of tuberculosis in cattle; do not feed creamery by-products unless pasteurized.

## SWINE CONDITIONERS

## No. 1

Glauber's Salts .....	3 parts
Salsoda .....	3 parts
Copperas .....	3 parts
Common salt .....	1 part
Sulphur .....	1 part

(Keep constantly before the hogs. This conditioner acts as a worm preventative.)

## No. 2

Charcoal .....	10 pounds
Hardwood Ashes .....	10 pounds
Lime (Air slacked) .....	10 pounds
Salt .....	5 pounds
Sulphur .....	5 pounds
Copperas (pulverized) .....	1 pound

(Mix thoroughly and put in a dry place where accessible to hogs.)

## No. 3

Charcoal (pulverized) .....	1 pound
Sulphur (pulverized) .....	1 pound
Sodium sulphate (pulverized) .....	1 pound
Antimony sulphide (pulverized) .....	1 pound
Sodium chloride (pulverized) .....	2 pounds
Sodium bicarbonate (pulverized) .....	2 pounds
Sodium hyposulphate (pulverized) .....	2 pounds

(Mix thoroughly and give a tablespoonful in ground feed once a day to hogs weighing 200 pounds and to others in proportion to their weight.)

## HOG WORM REMEDIES\*

1. Santonin .....5 grains
- Areca nut .....2 drams
- Calomel .....2 grains
- Sodium bicarbonate .....1 dram

This is a dose for 100 pound hog. If hogs can not be treated separately, doses should be mixed in slop or milk for 10 hogs, permitting only this number hogs to come to trough at one time. It is best to place hogs of the same size or weight together.

2. The U. S. Department of Agriculture recommends 15 drops of oil of chenopodium to one ounce castor oil for each shote weighing 60 to 100 pounds, preferably treating each hog separately.

3. Turpentine—one teaspoonful to 80 to 100 lbs. live weight fed in milk or slop once each day for three consecutive days. The hogs might well be fasted for 12 hours prior to giving turpentine. The last dosing should be followed by a physic at the next feeding by dissolving in the slop, epsom salts at the rate of one pound salts to 1000 pounds live weight.

\*Note—For most effective results each hog should be treated separately.

## COMMON AILMENTS, DISEASES AND PARASITES OF SHEEP

**Hemorrhagic septicemia:** An infectious disease caused by a specific variety of germs.

**Symptoms—**

Acute—Sudden death often without evidence of any symptoms.

Chronic—Lung form—difficult breathing, cough, bloody discharge from nose; death.

Intestinal form—bloody diarrhea, weakness; death.

**Treatment—**Call a veterinarian; kill chronically affected animals; immunize well animals and change pastures frequently, if possible, using well drained pastures.

**Scab:**

**Symptoms—**Same as cattle scab.

**Treatment—**Same as cattle scab.

**Internal parasites:**

**Gid, Grub in the Head and Lung worms** cannot be successfully treated; prevention is the logical method. Change of pasture helpful.

**Stomach worms:**

1. Segregate all suspected cases, withholding food for a day before treatment. Carefully drench with a 1% solution of copper sulphate in following doses:

Lambs under 1 year of age 1 to 1½ oz.

Sheep over 1 year old . . . 3 to 4 oz.

In drenching do not hold sheep's nose higher than eyes on account of danger fluid passing into lungs causing almost immediate death. A 1% solution is made by dissolving ¼ lb. copper sulphate crystals (powdered) in 3 gallons water in non-metallic receptacle. This amount is enough for 100 sheep.

2. Prevention is most logical; change of pasture helpful, but if impossible use following mixture:

Arsenous acid .....	1 dram
Sulphate of iron .....	5 drams
Powdered Nux vomica .....	2 drams
Powdered Areca nut .....	2 ounces
Common salt .....	4 ounces

This mixture is sufficient for 30 head and can be fed with chopped grain once or twice a week.



## COMMON AILMENTS, DISEASES AND PARASITES OF POULTRY

### Blackhead:

**Cause**—Due to a minute organism, the disease being infectious and contagious.

**Symptoms**—Indications in poults up to three weeks old are whitish or yellowish diarrhea and loss of appetite together with a dull weakened condition and a darkened head.

**Treatment**—There is no practical treatment. Might try keeping ailing poults in dry, ventilated quarters, feeding very little grain and once a week dosing with epsom salts at the rate of one teaspoonful to five poults. Give each poult  $\frac{1}{2}$  grain iron sulphate and  $2\frac{1}{2}$  or 3 grains sodium salicylate in a bread pill.

### Catarrh or Colds (nasal):

**Cause**—Improper housing conditions. Climatic exposure or sudden changes of climate.

**Symptoms**—Watery discharge from eyes and nostrils; sneezing; later the discharge becomes thick and sticky and eyelids swell and remain closed on account sticky secretion.

**Treatment**—Isolate affected fowls and give one-third teaspoon of epsom salts in a little mash. Add potassium permanganate to the drinking water for entire flock in proportion of one gallon of water to as much permanganate as will remain on a dime.

### Chicken Pox:

**Cause**—Contagious. Filthy, damp quarters weaken fowls vitality and when pox virus is present enables it to develop and produce the disease.

**Symptoms**—Small wart-like ulcers on head and face. Watering of eyes and nose.

**Treatment**—Remove nodules by softening with glycerine. Touch ulcer with iodine.

### Cholera: (A form of hemorrhagic septicemia)

**Cause**—Germ known as bacterium avisepticum, carried by recovered birds, wild birds, pigeons or any one having been on infected premises.

**Symptoms**—Acute—Fowls die within few hours of first signs of illness. Fowl becomes dull, sleepy and indifferent to its surroundings. Wings spread and drooped, dark blue comb and stringy mucus from beak. Soft diarrhea becomes bloody and foamy with whitish masses. Chronic

Similar to acute with swelling of leg joints. Post mortem shows inflamed digestive tract.

Treatment—Treatment almost futile. Prevent spread by moving healthy fowls to clean quarters, killing sick ones by bloodless method and burning carcasses. Give epsom salts to well flock. Use permanganate in drinking water and clean premises thoroughly.

#### **Egg Bound:**

Cause—Abnormal eggs; injury or derangement of oviduct.

Symptoms—Restlessness, nest visited frequently with unsuccessful attempt to expel egg.

Treatment—Introduce sweet oil into vent with finger to assist in expulsion of egg.

#### **Gapes:**

Cause—Gapeworm attached to walls of windpipe.

Symptoms—Breathing difficult, frequent gaping as if strangled. On post mortem small reddish worms will be found in windpipe.

Treatment—Remove chicks to fresh ground and disinfect runs. Place affected chicks in a covered box, dusting dry air-slacked lime over chicks with shaker can. Close the box for few minutes permitting chicks to breathe the lime dust which causes coughing and expelling of worms. Worms should then be destroyed.

#### **Lice:**

Live and reproduce on the bodies of fowls. Apply a pinch of sodium flourid at base of feather on head, neck, breast, base of tail, below the vent, both thighs and on underside each wing. One pound flourid will treat 100 fowls.

#### **Limberneck:**

Cause—Ptomaine poisoning; acute indigestion or severe infestation of intestinal parasites.

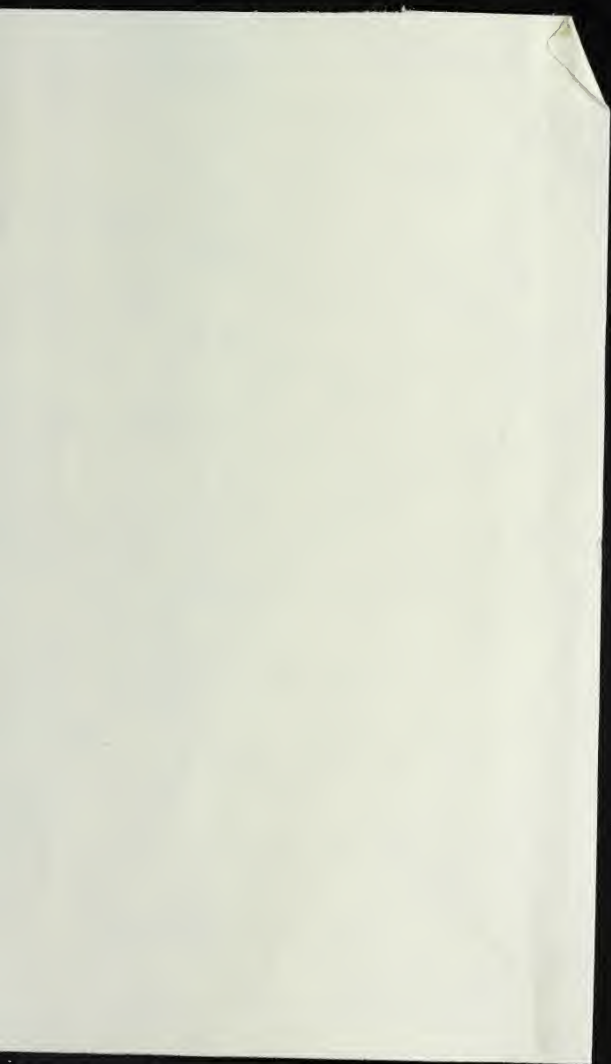
Symptoms—Neck limp with head hanging down between feet.

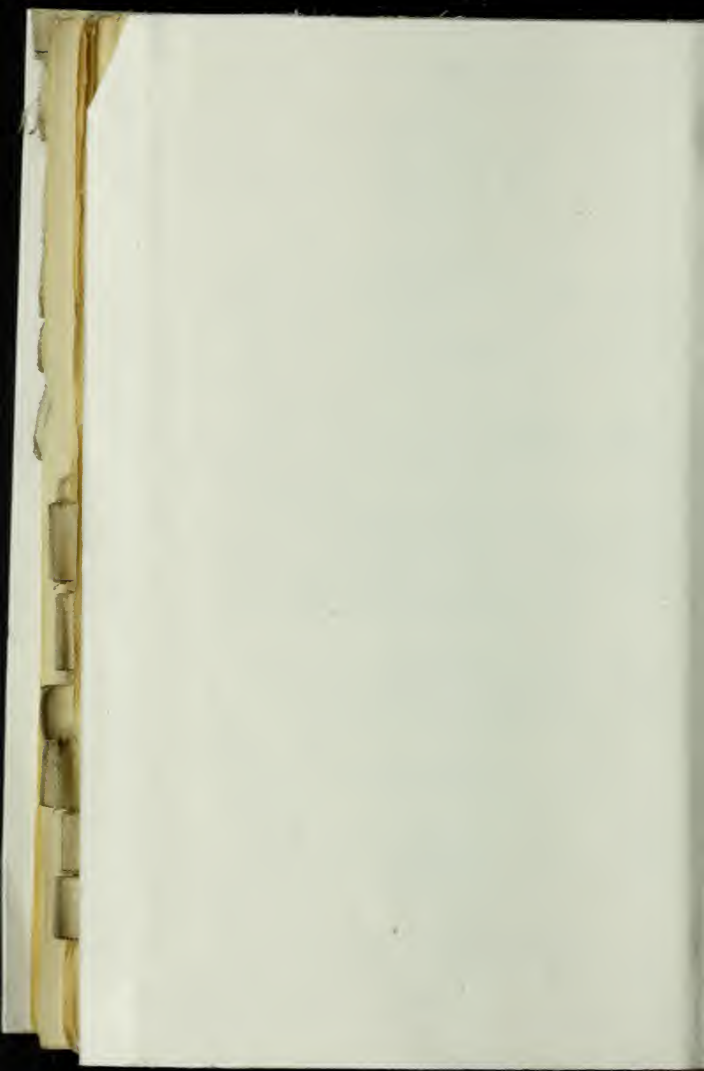
Treatment—Determine cause of condition and treat accordingly. A teaspoonful of castor oil given to the fowl will sometimes effect a cure.

#### **Mites:**

Live in filthy cracks and crevices of buildings and go on to the hens for food only. Apply strong disinfectant or kerosene thoroughly in region where mites are located as roosts, etc.









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